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NOVEMBER/DECEMBER 2000

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16 Vineyard diversity impacts wine style

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PERSONAL PERSPECTIVE

Fifty years of research at the world's largest winery

BY Arthur Caputi, Jr., Vice President, Technical Services (retired)
E&J Gallo Winery, Modesto, CA

In 2000, the American Society for Enology & Viticulture selected Art Caputi, retired vice president of technical services at the Ernest & Julio Gallo Winery, as its Merit Award recipient because of his significant contributions to the Society and the wine and grape industry for 50 years. Former ASEV president and board member for 20 years, Caputi tirelessly worked to develop and enrich the entire Society as well as the industry. — Jane Robichaud, President, American Society for Enology & Viticulture

Sir Isaac Newton once remarked that if he had seen farther than other men, it was because he had stood upon the shoulders of giants. While I don't claim to see farther than anyone else, I certainly have been privileged to stand upon the shoulders of giants. The shoulders of those giants, Ernest Gallo, Julio Gallo, and Charles Crawford, were remarkably broad and strong, and they supported not only me, but hundreds of others as well at the E&J Gallo Winery.

A look at the roster of presidents of the American Society of Enology & Viticulture (ASEV) over the last 50 years will reveal almost a dozen who worked at Gallo at one time or another. It would be impossible to be surrounded by individuals of such talent and ability and not learn something.

In June 1950, as a 15-year-old high school student with an interest in chemistry, I first stepped into the small laboratory of the E&J Gallo Winery. Although the facilities were relatively modest and dedicated primarily to winemaking and analyses, Charles Crawford (vice president, 1942–2000) and R.B. "Brad" Webb had already instituted a small research program.

Displayed prominently on a wall was a plan for a new and expanded laboratory that would provide additional space for research work. The foundation had been laid years before. When they founded the company, Ernest and Julio Gallo had determined that they would build the largest winery in the world, and they understood that technology would play a pivotal role in that endeavor.

Making the dream come true

Much of the technological expertise that existed in the wine industry prior to 1920 was lost during Prohibition, and precious little viticulture and enology research had been done anywhere in the U.S. from 1920 to 1933. Hiring Charles Crawford in 1942 was the Gallo's first step in building the kind of scientific capabilities they knew would be necessary if their dream was to become a reality.

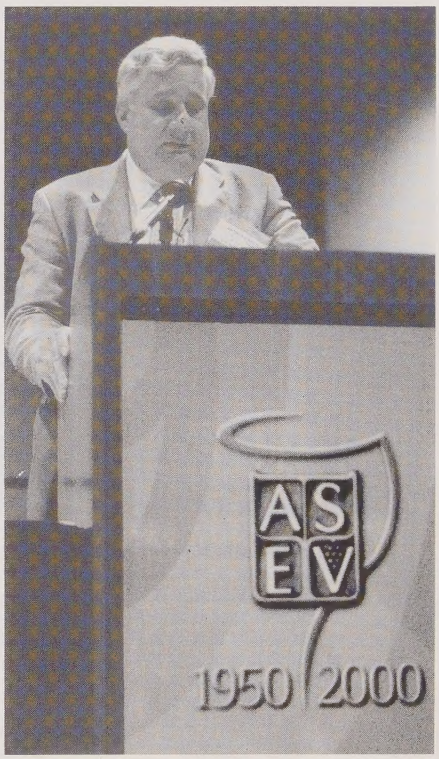
Crawford graduated from the University of California, Berkeley, in the same class as many other individuals who would become technological leaders of the wine industry in the post-WWII years, including Louis M. Martini (Louis M. Martini Winery), Myron Nightingale (Beringer Vineyards), Ze'ev Halperin (Christian Brothers), and Aram Ohanesian.

Until the viticulture and enology program at UC Davis became firmly established, the Food Science program at UC Berkeley was the training ground for many scientists who ultimately went into the wine business. Crawford, an ASEV charter member, past president, and Merit Award recipient, had a deep interest in research and the potential it held to help build the winery. Fortunately Ernest Gallo was of a like mind, and he told Crawford that he "considered research like savings. If you wait until you need it, it's already too late."

Growing quality grapes in the Central Valley

Ernest and Julio understood something else that would be of critical importance, not only to Gallo but also to the California wine industry as a whole — that even the most sophisticated winemaking techniques in the world could not produce a superior wine from inferior grapes.

The early table wines Gallo bottled came from Napa and Sonoma and were of excellent quality. However, if their dream to become the world's largest winery was to be achieved, table wine



Art Caputi was honored with Merit Award at the ASEV annual meeting in June 2000.

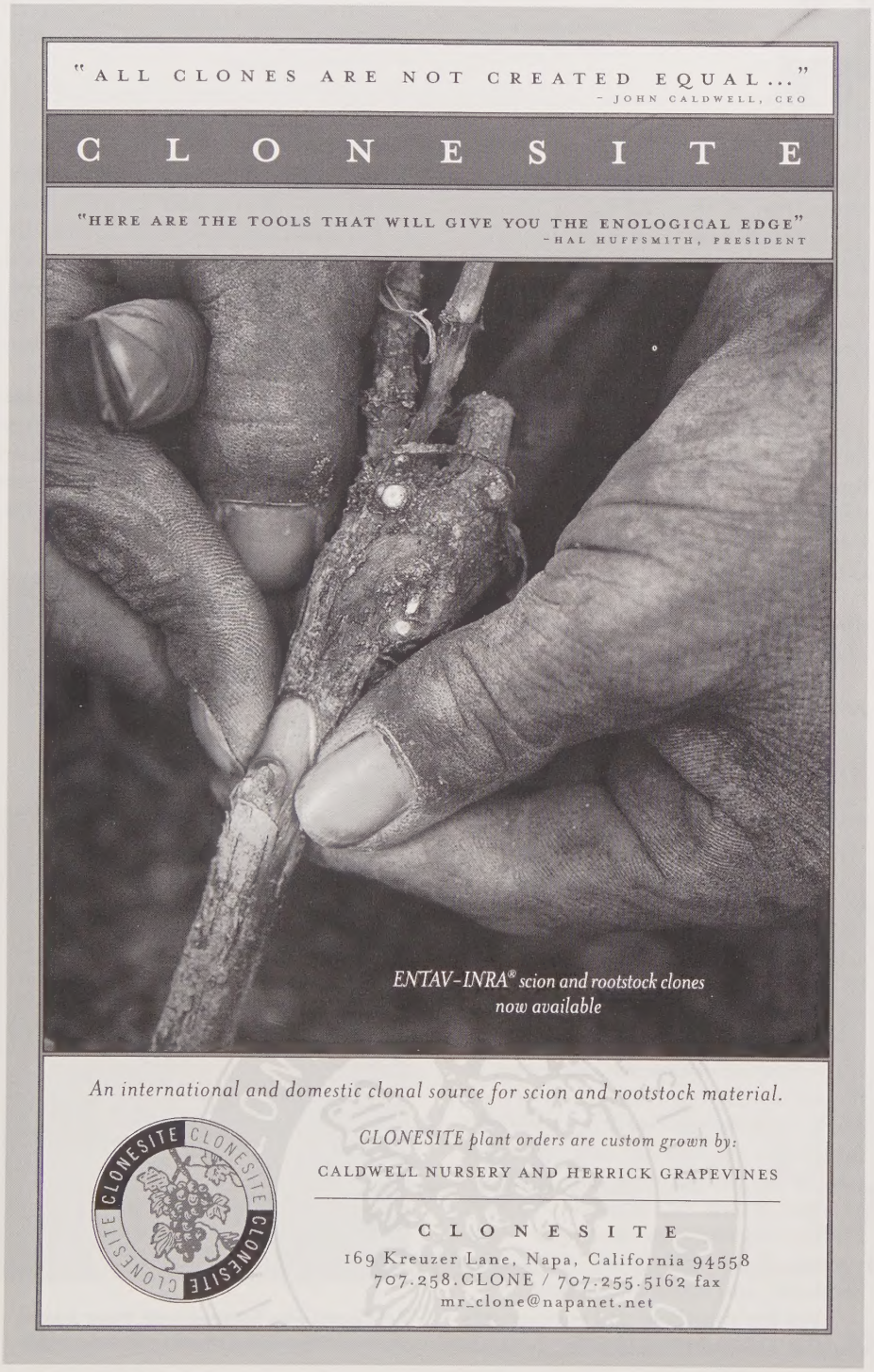
grapes of good quality would have to be available from the Central Valley as well. But the grape acreage that survived Prohibition in this area was generally less than ideal for table wine production.

Although the Thompson Seedless variety was very popular with Central Valley growers because it could be used for table grapes, raisins, or dessert wine, it clearly was not suitable for any kind of quality white table wine.

A similar situation existed for many red varieties that were not appropriate for good quality table wines. Despite the fact that dessert wines commanded the greatest part of the wine market after Prohibition, the Gallos knew that the real future lay with table wines, and they planned accordingly.

In the early 1940s, they purchased 160 acres near Livingston; this was the first parcel of what would ultimately become a 5,000-acre ranch, 4,000 of which are now planted in vineyards. In 1946, a portion of that vineyard was set aside for evaluation of various grape varieties. More than 400 selections were planted and experimental wines were made from each of the varieties for a number of years. Those that showed acceptable viticultural characteristics and produced better wines in that region than the varieties then available were propagated.

But after more suitable varieties were identified, another problem arose. The task of convincing growers to graft over their lower quality grapes was formidable, indeed. The Gallos finally accomplished it in 1967 by guaranteeing growers a minimum price for these grapes under 10 to 15 year contracts. Now 20 years of research to determine the best grape varieties for the Central Valley would pay dividends. That experimental work was the beginning of an active viticultural research program that continues, in a greatly expanded form, to this day.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Fulltime enological research begins

Although Crawford and the small group of winemakers carried out a number of applied research projects as time permitted, the addition in 1951 of Dr. Ralph Celmer (research director) to the staff as a full-time research scientist marked the beginning of the formal enology research effort at Gallo.

We also carried out experiments on accelerated ageing of dessert wines using oak chips, contact with granulated cork, controlled oxidation at very low levels of oxygen addition, and many other techniques.

In the summer of 1953, after I completed my first year at UC Berkeley, Crawford asked me to look into improving some of our analytical methods. It is axiomatic that measuring the effect of changes made by any kind of process must be undertaken if that process is to be properly utilized.

Crawford understood the need to improve the scope, accuracy, and speed of our analyses to provide Gallo's wine-

makers with more and better information for making key decisions.

Like everyone else, we analyzed titratable acidity by titrating wine samples in freshly boiled (and still extremely hot) distilled water to a phenolphthalein endpoint. Direct-reading analog pH meters had recently become available, and I saw no reason why such a device could not be employed for this very common and necessary analysis.

I also adjusted the normality of the titrant, so the result could be read directly from the burette without the need for further calculation. By implementing this technique, we achieved not only faster and easier analyses, but much more accurate ones, as well.

Over the course of several summers, I implemented several new analytical methods, including the micro-dichromate method for alcohol analysis, rapid procedures for aldehyde and fusel oil analyses, a rapid reducing sugar test for use in our fermentor laboratory and many others. Development of new analytical methods has continued to this day, and many procedures we devised have been published over the last 45 years or so.

Viticulture and Enology at UC Davis and Fresno State

The technical people at Gallo always have had the utmost respect for the faculties and staff of the viticulture and enology departments at UC Davis and Fresno State University. We have sought their advice and cooperation at every opportunity.

Maynard A. Amerine had been a classmate of Ernest and Julio at Modesto High School. He obtained his Ph.D. and, with Albert Winkler, went on to become one of the pivotal figures in the Department of Viticulture & Enology at UC Davis. The faculty and staff assembled in that department laid the foundation for several generations of winemakers and viticulturists who rebuilt an industry devastated by Prohibition.

The department was built upon people like Amerine (who would remain a lifelong friend of Ernest Gallo), Winkler, Harold "Hod" Berg, James Guymon, A.D. Webb, Vernon Singleton, Cornelius Ough, Lloyd Lider, Mark Kliewer, Curt Alley, Amand Kasimatis, Harold Olmo, George Marsh, James Cook, Hank Nelson, Ralph Kunkee, and others. They initiated wide-ranging research programs and designed and taught courses that educated a significant percentage of the professionals in the wine and grape industries in the second half of the 20th century.

These individuals did not operate in academic isolation or from a purely theoretical standpoint. Many had previous industrial experience, and all worked closely with the industry they were dedicated to improving. Much of the early research that came out of the department focused on solving the

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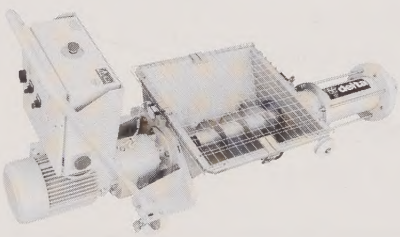

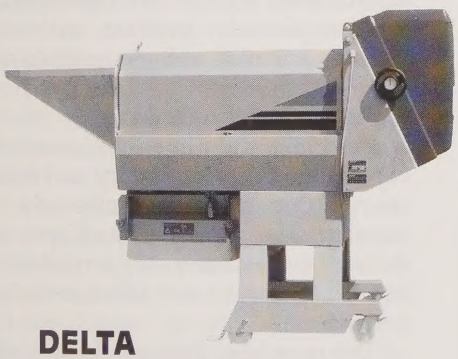
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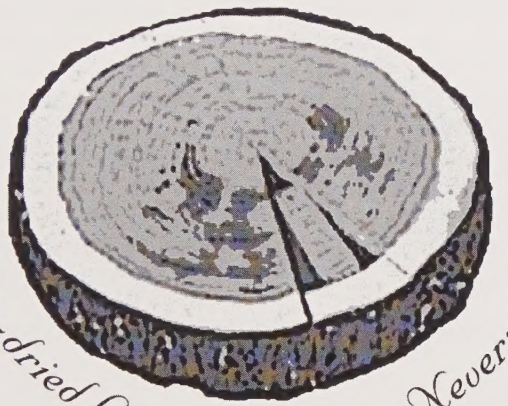

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numerous practical problems plaguing the industry.

Evaluation of various grape varieties and rootstocks for optimum performance in different areas of California became an important element of the department's work, as did Olmo's efforts to breed new varieties that offered valuable characteristics for certain regions and wine styles.

The department educated the industry about the importance of proper sanitation procedures and the need for appropriate construction materials to avoid product contamination by trace materials or microorganisms. The effects of many factors on fermentation characteristics and wine composition were studied in detail, and the results immediately became available to the industry. Amerine's work laid the foundation for the sophisticated sensory analysis used in the industry today.

The industry also benefited enormously from a somewhat smaller but very vigorous viticulture and enology program at (then) Fresno State College, which began under the direction of the indefatigable Vincent Petrucci. Some of the state's foremost viticulturists and enologists are graduates of that school, and many alumni of that institution matriculated at Davis and elsewhere for advanced degrees.

The majority of Gallo winemakers and a large number of the research staff in the past were, and today are, products of these schools. We have continued to actively interact with the research scientists at these institutions.

Expansion at the Gallo lab

By 1957, the time had come to expand the Gallo laboratory and build an addition devoted exclusively to research. The plans that had been on the wall even prior to my arrival were not suitable, and I was asked to design a new facility.

This was the first of three Gallo laboratories for which I prepared the specifications and then worked with architectural firms and contractors to produce the final structure. It was, by our current standards, rather modest, but it provided us with the basic space and equipment needed to move our research to the next level.

Ralph Celmer had left Gallo at this point, but Lewis Stern (an early ASEV officer) had joined the company as the chief table winemaker in the mid-1950s, along with Dimitri Tchelistcheff, who wore several hats, working as an enologist and in research developing new products in particular. Celmer developed Thunderbird, our first flavored special natural wine, and Tchelistcheff conceived many others.

Innovations from the Gallo team

Stern was concerned about oxidation of white table wines and asked B. J. Williams, a microbiologist new to the company, and me to find a solution. Williams and I located ceramic diffusion tubes that could be attached to plastic tubing reaching to the bottom of a bottling tank. We found that when we hooked a diffusion tube to a cylinder of nitrogen and put it in the tank, it could release a stream of minute bubbles that would sparge dissolved oxygen from the wine. Of course, it was then necessary to measure the amount of dissolved oxygen to enable us to remove only the amount necessary and to avoid stripping desirable volatile compounds from the wine.

Although the dichloroindophenol titration used to measure dissolved oxygen in water was tried, it was cumbersome and incapable of the accuracy we wanted. I used a dropping mercury polarographic procedure for this measurement, enabling us to expand our use of oxygen removal to include carefully controlled nitrogen stripping when transferring sensitive wines within the winery and from our Fresno facility to Modesto.

A few years later, the first Clark one-piece polarographic electrode became available, and we published a paper on its use for the measurement of dissolved oxygen in wine. It since has become the standard analytical tool for this measurement in the industry.

By 1956, the principles of gas chromatography (GC) were just reaching the hands of analytical chemists, but commercial instruments were not readily available and were prohibitively expensive. I was reasonably knowledgeable about electronics and fairly adept with a soldering gun and other tools. I built a gas chromatograph and, with numerous modifications over the years, it is still in operation today. It enabled us to separate and quantify trace volatile compounds, such as the individual fusel oil components of distilled spirits, which improved our distillation procedures.

A new research director, Robert J. Bouthilet, was hired in 1958, shortly after completion of the new research lab. Bouthilet hired a number of new scientists including Dr. Richard Peterson, Karl Popper, Dr. George Thoukis, and Masao Ueda, and the latter two are still with the company.

New tools for winemakers

The next decade featured commercialization of a number of processes new to the wine industry. The late 1950s saw much research on ion exchange, initially to achieve tartrate stability and later to provide additional tools for winemakers in treating certain wines. Karl Popper became the resident expert on these processes and developed a substantial number of variations on the basic technology.

For wineries bottling wines with small amounts of residual sugar, pasteurization was commonly used to keep wines from undergoing fermentation in the bottle. This heating process inevitably had a deleterious effect on the product, and the industry searched for a viable alternative.

Sterile filtration was used by several wineries employing asbestos sheets in plate and frame filters, but the process was cumbersome and fraught with peril from a microbiological standpoint. Thoukis discovered that some brewing companies were using membrane filtration to achieve a sterile product and thought it might have a wine industry application. A project was set up in 1960 in conjunction with

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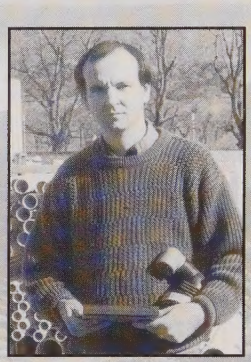

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the Millipore Corporation to apply this technology to our wine process. By 1961, all of Gallo's pasteurizers had been replaced with membrane filters, resulting in another significant improvement in product quality.

In 1961, Cornelius Ough and John Ingraham published a paper on the use of diethyl pyrocarbonate (DEPC) as a possible bottled wine sterilizing agent. DEPC rapidly decomposes to ethanol and carbon dioxide after addition to wine, and it has no effect on sensory properties of the product.

Thoukis, Ueda, and I followed the decomposition rate using radioactively-labeled DEPC and showed that over 98% of the compound hydrolyzed to ethanol and CO_2. Most of the remaining by-products could be accounted for as ethyl carbonate and carbomethoxy derivatives, within experimental error. Since only 100 mg/L or so of DEPC was needed to achieve sterility in properly filtered wine, it was the perfect complement to membrane filtration if added just before the bottle was filled.

We had, long ago, found fermentations using indigenous yeast to be unpredictable, marked by variable sensory properties and the occasional stuck fermentation. We inoculated juice with selected yeast strains, but were forced to propagate yeast from a slant to a small flask of juice and subsequently to larger vessels until a sufficient quantity was produced to properly inoculate a fermentor. Intermediate steps included 1-liter, 5-liter, and 5-gallon containers of sterilized juice before preparation of a 250-gallon starter tank. This was clearly inconvenient, time consuming, and expensive.

John Castor at UC Davis had demonstrated a number of years earlier that wine yeast could be produced in a five-gallon aerated fermentor and harvested as a compressed cake. At about the same time, Dr. A.M. Adams in Canada described the collection of wine yeast in the form of small filter cakes that could be stored frozen and later used as an inoculum for wine fermentations.

Baker's yeast was produced commercially in a similar manner, so Thoukis developed a joint project with Dr. Gerald Reed of Universal Foods Corporation to produce wine yeast, first as frozen cakes then later as a dried product. The dried form could be transported easily and stored and rehydrated just before use. Thoukis presented a paper on production and use of compressed yeast at the 1963 ASEV Annual Meeting, and this material has become widely used in the industry.

The early 1960s saw development and implementation of large-scale submerged culture production of flor sherry. Although Amerine and Ough, using pressurized vessels, had demonstrated the principle on a small scale, we achieved the same effect at atmospheric pressure in production tanks.

R.L. Nowlin, our chief engineer at that time, suggested the hydrostatic head in a large tank would provide adequate pressure with a proper circulation system. Such a system was constructed and worked perfectly. This period also produced evidence that temperature-controlled fermentations produced wines of a higher quality, and enormous amounts of refrigeration capacity were added. With increased use of stainless steel tanks insulated with urethane foam, wines could now be stored at optimal temperatures outdoors. The traditional cellar consisting of wood or concrete tanks in a fully enclosed building began to disappear.

When low alcohol, lightly carbonated wines were introduced, it became necessary to devise techniques to reproducibly carbonate the wines to the desired level and to analyze the CO_2 content. By generating comprehensive CO_2 solubility data for various products and different temperatures, we achieved consistent carbon dioxide levels in bottling tanks. A number of analytical procedures were devised, each faster and more accurate than the

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previous ones. Almost all were validated and published.

During this period, the first experiments with mechanical harvesters of our own design were conducted at the Livingston ranch. Although some positive results were obtained, Julio Gallo felt the resulting wine was not as good as that produced from the same grapes that had been hand-picked. As a result, we delayed the acceptance of mechanically-harvested fruit until the technology became more refined.

Introduction of our first Charmat-process Champagne was hugely successful, and it became necessary to produce larger quantities than our initial industry-standard 2,000-gallon tanks could provide.

Crawford and my father, who headed the company's maintenance and much of its engineering functions, found a couple of surplus 20,000-gallon liquid oxygen tanks from a decommissioned missile site and felt these could be used as large Charmat fermentors. I made some calculations to see if we could bottle from these large vessels isobarically without losing any significant CO_2 content. The calculations were favorable, and the tanks were acquired and installed by my father. They performed flawlessly. Additional tanks of the same size and even larger were later added.

New facilities, new staff

When Bouthilet left Gallo in 1963, Richard Peterson and I assumed responsibility for administration of the research department, and we prepared to move into a large new facility. I worked with an architectural firm on design of a new building to house the winemaking, analytical, and research departments.

We moved into the new quarters in May 1969 shortly after Peterson's departure. The engineering and personnel groups initially were included in the structure as well, but like the company as a whole, the laboratory expanded rapidly in the 1970s, and those departments were soon moved to another location.

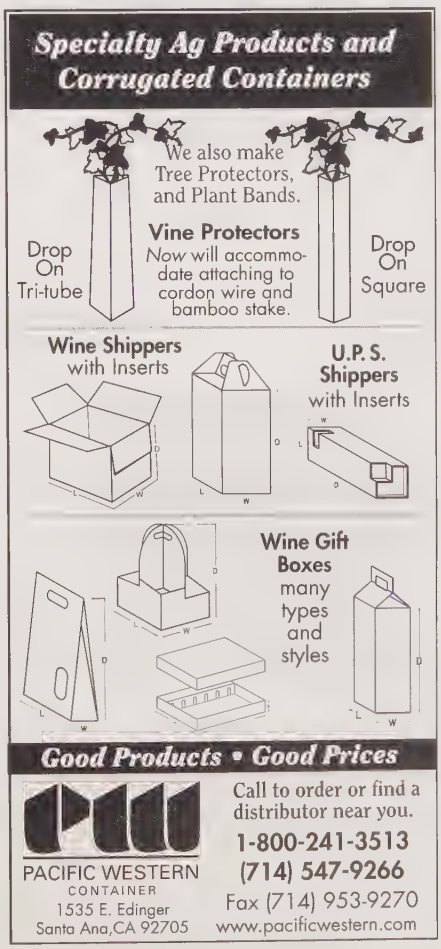
Tchelistcheff and Popper left about the time of Bouthilet's departure, and we had to find new staff members to carry on the work. With the move into the new laboratory, people like Dr. Richard Morenzoni from the UC Davis enology program, Dr. Thomas Wong from the food science program at UC Davis, and James Peck, one of Maynard Amerine's last graduate students, were added to the research staff. These individuals became key contributors to research done in the new building throughout the 1970s, 1980s, and into the 1990s.

Morenzoni did his graduate work on malolactic fermentation under Ralph Kunkee and continued his investigation of that process, but now on a commercial scale. He also worked with commercial suppliers of yeast to obtain various strains and select particular ones to optimize different fermentation needs. Procedures were developed and implemented to measure the viability of incoming shipments of dried yeast.

Because many of our products were now being sterile-bottled, it was necessary to put into place even more stringent sanitation procedures and comprehensive sampling and plating procedures to ensure all bottled wines were microbiologically stable. These were all accomplished with advice and direction from Morenzoni, and he was instrumental in design of microbiological facilities at all company production locations.

An enormous amount of work went into optimizing protocols for production of fermentation starters. Morenzoni's group used DNA Karyotypes to follow the characteristics of yeast populations under various fermentation schemes, demonstrating that the presence of excessive levels of fluoride caused increased amounts of volatile acidity and other by-products during fermentation.

Most recently, this group developed microbiological "fingerprints" for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wines produced at our North Coast facility. Several lots of wines were made using various combinations of yeast and malolactic bacteria, and the resulting wines were carefully evaluated. This led to the current practice of using specific yeast and malolactic bacteria combinations for wines produced at that winery.

Wong brought a strong background in enzymology, and he identified enzyme preparations that could improve juice yield, wine filterability, and optimum color characteristics. He has continued, to this day, to evaluate new enzyme preparations and optimize their use. With assistance from a number of other staff members, Wong developed a cellulose fiber filtering material that was patented and employed in our filtration process for many years.

His interest in filtration led him and his associates to explore and implement new membrane technologies, such as ultrafiltration, nanofiltration, and crossflow filtration. As new materials and equipment became available, adoption of various uses for these processes continued throughout the 1980s and 1990s.

Adding a sensory evaluation program

Although wine tasting had always been an important aspect of the company's ongoing commitment to quality, we had no formal sensory evaluation program or tasting booths until construction of the new laboratory in 1969. A small sensory area was incorporated in the design, and the booths were provided with filtered and conditioned air and red illumination to obscure differences in wine sample appearances.

Jim Peck, who had extensive sensory training under Amerine, set up the first trained tasting panels in the building and also carried out many other research projects.

Addressing regulatory concerns

A variety of projects filled the 1970s and 1980s, many dealing with regulatory requirements. New waste disposal techniques were developed and implemented at all corporate production sites.

When the California Air Resources Board suggested winery fermentation emissions might be a source of unwanted ozone precursors, our staff worked with other wineries through the Wine Institute to develop important data on this issue. Much experimental work was carried out in conjunction with Professor Carlos Muller at California State University, Fresno, to substantiate the industry's position that controlling these emissions mechanically was unfeasible.

In the late 1980s, the U.S. Food and Drug Administration became concerned about the presence of traces of

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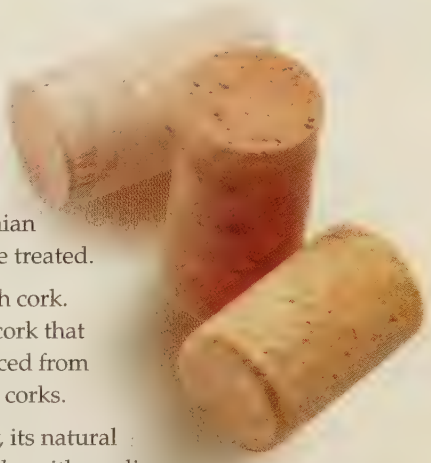

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ethyl carbamate, a suspected carcinogen, in fermented foods and beverages. A comprehensive study was initiated (that continues to this day), in which Gallo scientists worked with academicians, principally C. S. Ough and Linda Bisson, to elucidate all the factors involved in the formation and control of the traces of this naturally-occurring compound.

The first work implicating arginine as a precursor for urea in wine was done by the Gallo microbiology group and brought to the attention of UC Davis researchers, who developed it further. These efforts are typical of the kinds of interaction that exist between the Gallo technical staff, academia, and the rest of the industry.

By the early 1990s, it became clear that E&J Gallo Winery's technical needs had outgrown existing facilities. Again, I prepared specifications for and helped design and staff a new research building. It was based upon an organizational structure that was logical at that time, but the facility would be entirely modular in concept, so it could easily be modified when the need arose.

Adding a chemistry team

A chemistry group, then under Dr. Jeff McCord and now directed by Dr. Tim Ryan, was charged with investigating the volatile and non-volatile components of wine and establishing the sensory effect of each component, singly and in combination. Part of this group developed specialized analyses and automated routine procedures for the analytical department. Many robotic procedures have been implemented for common analyses, and capillary electrophoresis methods have been developed for analysis of proteins, organic acids, specific amino acids, and numerous inorganic ions.

Work by the microbiology group

A microbiology function was incorporated to supplement the existing group and provide additional research capabilities for this critical aspect of the winemaking process. It since has been merged with the genetics team to form a life sciences group led by Dr. Nancy Irelan.

A major effort has been directed toward physiological characterization of wine microorganisms using the BIOLOG microplate system that measures the growth of microorganisms on various carbon sources. The pattern of growth is compared to the patterns of type strains in the database, and the degree of similarity calculated.

We have constructed our own custom databases of wine microorganisms including *Saccharomyces cerevisiae, Hanseniaspora (Kloeckera)*, and several others. These databases are being used to build a picture of the microbial ecology of wine fermentations at Gallo, which hopefully will lead to a better understanding of the process.

One member of the microbiology group, Dr. Roy Thornton, has a strong background in classical breeding techniques and has used these techniques to improve winemaking properties of Gallo's preferred wine yeast strains. The group has collected over 70 *Dekkera (Brettanomyces)* strains from California and around the world. They were characterized by BIOLOG and separated into several distinct physiological groups with a wide range of physiological/biochemical activities.

Research in molecular biology and genetics

A molecular biology/genetics group was created to study both plants and microorganisms at the molecular level. A number of achievements already have been realized in the area of molecular diagnostics for vineyard, wine, and juice-related microorganisms. The team has developed robust, rapid, PCR-based, plus-or-minus molecular identification tests for a wide range of vineyard pathogens and wine yeasts, such as *Eutypa, Botrytis, Brettanomyces, Zygosaccharomyces,* and *Torulaspora,* to name only a few.

Tests for six vineyard pathogens have been patented, and tests for 13 yeast species are in patent-pending status. Because the tests are rapid, easy to perform, and produce plus-or-minus results, any technician can easily be trained to use them and interpret the outcome. The tests have already been successfully transferred to production microbiology laboratories in several locations, and implementation of the technology is continuing.

The team working on plant genetics has extensively studied Eutypa, a dieback disease of grape vines, which affects grape production around the world and is caused by the fungus, *Eutypa lata*. The group obtained and collected 116 isolates of Eutypa species from grape, cultivated species, and native tree species. They used Amplified Fragment Length Polymorphism (AFLP) to produce genetic fingerprints and analyzed specific regions of DNA sequence from each isolate.

The results indicate that there are two species, *Eutypa lata* and *Eutypa armeniacae*, capable of causing this disease. Of equal importance is the discovery that both of these species of Eutypa can grow on many native tree species in California, meaning there is always a ready source of inoculum to further spread the disease.

In addition, information from the DNA-sequence analysis derived from this research was used to generate diagnostic tools for Eutypa. A Polymerase Chain Reaction (PCR) based method was developed that allows detection of Eutypa in woody vine material long before symptoms appear. This tool enables researchers to investigate growth of the fungus in the vine and enables a better understanding of the disease process. This diagnostic method has been patented worldwide, and is currently being made available to academic researchers free of charge.

Some of the initial research within the genetics program involved investigating the genetic diversity between a number of *Vitis sp.*, representing native species from North America, and other species from around the world.

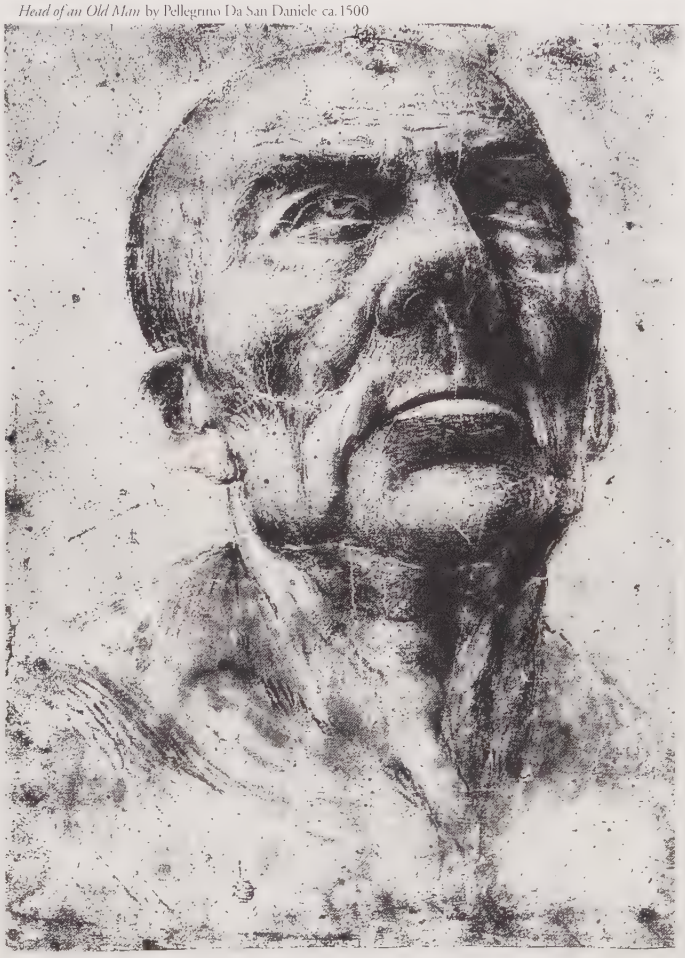
Investigations of wild Vitis *species*

Wild *Vitis* species contain a wealth of germplasm that is a potential source of genetic material for improving existing cultivated species of grape. Breeders have used this genetic material via classical methods to develop rootstocks resistant to Phylloxera and nematodes. Other rootstocks have been developed that perform well over a wide range of soil and climatic conditions.

A detailed understanding of the genetic diversity, or relatedness, between the wild species is an important starting point in utilizing this resource in a more specific and efficient manner. In our laboratories, AFLP was used to analyze 66 *Vitis* accessions representing 18 wild species of grape and compared with *Vitis vinifera*; the first time this technique had been used to analyze a diverse group of *Vitis* species. Results of this research were presented at the Sixth International Plant & Animal Genome Conference in 1997.

Continued on page 78

Head of an Old Man by Pellegrino Da San Daniele ca. 1500



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VARIETAL REVIEW

Crafting Sauvignon Blanc

Vineyard diversity impacts wine style

BY Eleanor & Ray Heald
Contributing editors

Zesty Sauvignon Blanc. What's that? More than lemon or grapefruit zest — legitimate Sauvignon Blanc descriptors. We have an exciting, aromatic, and palate-stimulating white wine in mind. Not over the top. Not too in your face. Not too crisp. Far from wimpy. Zesty. You can smell and taste this descriptor!

For American consumers, forget grassy. Consumers aren't cows. They don't eat grass. And pitch out hay, too. Fruity and spicy? That could be any wine. But hold that thought.

Add garden herbal. That's good. Cooler climate sourced, fairly vigorous vines grown in more fertile, deeper soils; denser canopies; more shaded, less mature fruit.

Fruitier style Sauvignon Blancs hail from warmer climates with less fertile, more gravelly, sandy soils. Vines are less vigorous, with less dense canopies. More sunlight on the fruit achieves higher maturity. Barrel fermentation works nicely with these fruit characters.

Welcome 21st century Sauvignon Blanc! With modern trellising or retrofits, a vineyard can achieve both garden herbal and fruity qualities — and be uniquely Sauvignon Blanc. We're not suggesting that asparagus and floral make a match here! But lemongrass with some melon notes do just fine.

Spicy. That character is cellar-built with barrel fermentation, barrel ageing, and choice of cooperage. Lees contact and decisions about malolactic fermentation (MLF) also impact style.

PWV interviews West Coast produers to learn their vineyard and cellar techniques for crafting zesty Sauvignon Blanc, gleans ideas from New Zealand, and brings readers French thinking (page 28) on the varietal.

Regional differences

To establish as many as 40 blending elements for its Sauvignon Blanc, Geyser Peak Winery sources fruit throughout California, predominantly Sonoma County, but as far south as Monterey County and north to Mendocino and Lake counties.

PARTICIPATING PRODUCERS:

Erik Olsen, winemaker
Chateau Ste. Michelle
Woodinville, WA

Ed Killian, winemaker
Chateau Souverain
Geyserville, CA

Jeff McBride, winemaker
Duff Bevill, vineyard manager
Dry Creek Vineyard
Healdsburg, CA

Mick Schroeter, winemaker
Geyser Peak Winery
Geyserville, CA

Jeff Hinchliffe, winemaker
Hanna Winery
Healdsburg, CA

David Munksgard, winemaker
Iron Horse Vineyards
Sebastopol, CA

Michael Beaulac, winemaker
Markham Vineyards
St. Helena, CA

"Monterey fruit is distinctive," Geyser Peak winemaker Mick Schroeter says. "It has more green bean and herbaceous qualities, typical of a cooler climate. Warmer northern Alexander Valley fruit has less distinct varietal character as we call it. It's more tropical. Other areas give us everything in between.

"Adding 3% to 5% of Monterey wine has a significant impact on a wine we label Sonoma County. We would not bottle the Monterey wine by itself, because it's not the Geyser Peak style, but it's a marvelous blending component."

Markham Vineyards sources Sauvignon Blanc throughout Napa Valley. "Calistoga is the hottest area, but the vineyards we source there are at the base of Mount St. Helena where an inversion makes it cooler," winemaker Michael Beaulac explains.

"Grapes from Carneros are the most herbaceous (aromatic lemongrass) of our grapes. They fit the grapefruit-style I'm shooting for. Wine from Calistoga fruit is more tropical melon and rich. I prefer warm climate Sauvignon Blanc, where the fruit has had significant sun exposure."

Jeff Hinchliffe, winemaker at Hanna Winery, adds that, in both Sonoma and Mendocino County fruit sources, he has not experienced any asparagus characters.

Winemaker Jeff McBride, Dry Creek Vineyards, notes that vegetal characters are evident from older vines on some sites in Dry Creek and Alexander Valley. These characters are not due to clonal difference because there are only two: UCD-Clone 1 (known as Sauvignon Blanc) and Sauvignon Musqué (easily identified for its grapefruit and gooseberry aromas, never vegetal).

"If clonal selections are taken from multiple sites, then grown on the same trellis system in the same microclimate, they will offer the same characteristics," McBride affirms.

Winemaker Erik Olsen from Chateau Ste. Michelle sources from the three regions of Washington's Columbia Valley, and each one develops its own fruit characters:

- The Wahluke Slope in the north is the hottest and yields juicy, tropical flavors.
- Yakima Valley is the coolest region with deep soils. Its herbal wines constitute about 10% to 15% of the Chateau Ste. Michelle blend.
- Paterson is a medium-hot area that develops grapefruit, citrus qualities.

Adopting deficit irrigation has been the primary canopy management principle at Chateau Ste. Michelle, Olsen reports. In the dry climate of eastern Washington, with only six to eight inches of rain per year, vineyards start the growing season in water deficit. (Some water may be applied early to provide adequate moisture to get the vines past bloom, but water is then held back.

Once the vines have three to four feet of shoot growth, irrigation is restarted to replace only what the vines use in transpiration.

"We leaf-pull and grow a smaller canopy than we grew 15 years ago when flavors were distinctly green bean and unpleasantly herbaceous," Olsen explains.

"Through better canopy management, with more fruit exposed to the sun,

we've been able to reduce herbaceous character and develop more melon, grapefruit, and citrus qualities by harvest at the end of September. The yield is four tons per acre (TPA) from 20-year-old vines that have experienced vascular damage throughout a number of winter freezes. They will not set a crop larger than this and are in good balance."

Narrowing the source range

Chateau Souverain grows about 70% of the grapes for its Sauvignon Blanc from the warmer, northern Alexander Valley between Geyserville and Asti. This area is mainly semi-benchland with thinner, red-iron soils and gravel beds. Another 15% is purchased from the same area.

The remaining 15% is sourced from cooler areas near Fulton in Sonoma County and in Lake County, where days are warm, but nights are quite cold. "Soils near Fulton (in the Russian River Valley AVA) are fertile, clay, hardpan, low perk, dark, and peat-like, producing vigorous vines," notes Ed Killian, winemaker.

"Keeping vines uniformly healthy with sufficient water to the end of the growing season in less fertile Alexander Valley soils is problematic. Soil variations in this vineyard mature fruit at different times (from a few days to as many as 10), so we pick different blocks at different times.

"Soil variations also make it difficult to establish same-pattern irrigation. We're in the process of fine-tuning water application in the hopes of regulating maturity, so more blocks can be picked at the same time."

The Alexander Valley estate vineyard parcel is divided into three blocks. Six blending blocks are achieved when all sources are totaled.

Estate vineyard vines are more than 10-years-old and yield 3 to 5 TPA. Newer plantings yield 7 TPA. Killian notes that the winery is applying proper irrigation and doing nutrient analysis in the estate vineyard to raise the yield to five TPA.

Iron Horse Vineyards grapes come from one Alexander Valley vineyard with three relatively distinct blocks: one steep hillside, another bottomland along an old creek bed with fertile soil, and the newest, a 1994 planting along rolling hills.

"The creek bed site is most apt to yield fruit with herbal qualities, but by waiting for greater maturity, those characters disappear," says winemaker Dave Munksgard. "To minimize

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canopy, we use minimal irrigation and intensive canopy management."

For Hanna's Sauvignon Blanc, Hinchliffe works with a single Russian River Valley site having soil types ranging from old river bed to deep Yolo loam. "Since we've chosen estate bottling and do not have the complexity from multiple sites, we've reverted to alternate-year leaf pulling on three sides of an S-type divided canopy on some vine rows, so the same blocks are not shaded every year," he explains.

When various rows are picked, three building blocks contribute aromas and flavors spanning the spectrum from celery, green bean, and bell pepper to tropical.

Vine management drives style

Vineyard manager Duff Bevill at Dry Creek Vineyards remarks that site drives the Sauvignon Blanc style. The Dry Creek Valley estate vineyard is on 20-feet deep Yolo loam and was planted to Sauvignon Blanc in 1972. It is the core of the blend. Picked at the same maturity each year, it consistently provides the same fruit character.

"In the last 10 years, we've played with maturity levels more than ever before," Bevill notes. "At 21.5° Brix, the wine produced is powerful and grassy, unmistakable Sauvignon Blanc. At 0.5° Brix higher, that grassy character begins to disappear, and if we let grapes mature to 22.5° to 23° Brix, the wine loses its striking Sauvignon Blanc character and transcends to fig-like descriptors.

"We began to replant this vineyard six years ago. It was formerly a California floppy trellis. For 15 years, we experimented with leafing inside the canopy to control bunch rot susceptability. In doing so, we began to loose some grassy character. Now, to harvest some fruit with distinct grassiness, we don't leaf remaining older vines at all, unless we see rot developing."

For replanting, Bevill chose the Scott-Henry trellis for Clone-1, planted on 5-C rootstock. He expected it would change the fruit characteristics, but at the time had no idea how. Scott-Henry is more harvest-friendly (mechanical harvesting), but has not provided predictable yields, producing barely 3 TPA one year and as much as 8.5 TPA the next. Bevill does believe that as vines age, a balance at 7 to 8 TPA is possible.

In another block, consistent production of 7 TPA was achieved after a conversion to an open lyre trellis. Due to phylloxera, however, this block will be replanted.

Emphasizing that site still drives the character of the fruit whether it's on

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Scott-Henry or a lyre system, Bevill says time of harvest remains a major factor in creating a flavor profile.

What's the right trellis?

Bevill reports that the old California sprawl trellis system could encourage undesirable flavor characteristics in Sauvignon Blanc. With new trellises, fruit can be encouraged to yield the characters desired for a particular winery's style.

Aggressive leaf pulling to allow more sunlight on the grapes will also reduce what have traditionally been known as the distinctive vegetal Sauvignon Blanc varietal flavors.

"Not only that, excessively exposed fruit also results in mediocre flavors," Schroeter adds. "It's important to consider this for north-south oriented rows. Full afternoon sunlight on grapes on the western side of the vines is too extreme.

"At Geyser Peak, we've gone to a half VSP; tucking up the eastern side of the vines and leaving the western side to flop down. There is a marked difference in fruit from each side of the canopy.

"The western side has less distinct Sauvignon Blanc character and tends to be more melon and tropical due to increased sun exposure. Bunches are more golden than those on the eastern side, which retain bright green coloration."

For the Geyser Peak style, Schroeter continues to favor the "old-fashioned" canopy with a simple T-trellis allowing dappled sunlight with minimal leaf pulling.

"On Scott-Henry, there is virtually no leafing," Bevill continues. "The best balance is achieved by removal of all secondary shoots in mid-summer to achieve the dappled sunlight look. More golden fruit is noticeable on the western side. On Scott-Henry, vines are quite fruit-balanced, but we do drop bunches at veraison to 'unstack' the fruit and have bunches hang freely."

Stacking of fruit is a problem with VSP, especially if a grower is aiming at higher yields, Schroeter notes. Botrytis, to which Sauvignon Blanc is very susceptible, then becomes a problem.

All participants agree that with newer plantings on modern trellis systems, style evolutions will undoubtedly occur.

Rootstock impact

Currently, Chateau Ste. Michelle vines are own-rooted, but thinking to the future, Olsen asks, "What is the impact of rootstock on Sauvignon Blanc?"

Without setting up some type of control, Bevill considers it impossible to know. For all Dry Creek Vineyards plantings of Sauvignon Blanc, he has chosen 5-C, 101-14, and 3309, to match soil types.

"The trellis system and vine spacing, well-chosen for the site, are far more important than rootstock consideration," Bevill maintains.

Harvest parameters

"Flavor is paramount," Beaulac says when it comes to harvest parameters. "We go out and sample like everyone else. The numbers may look correct, but if the fruit does not taste the way it's supposed to, you need to wait.

"Because I'm picking Sauvignon Blanc, Sauvignon Musqué, and Semillon for the Markham blend, I target 22.5° Brix or in that ballpark for Sauvignon Blanc; about the same for Semillon, but rarely achieved; and 23.5° Brix and up for Sauvignon Musqué, but the decision of when to harvest has to be based on flavor."

Olsen adds that each vintage in Washington State is different. In 1998, fruit had very ripe flavors at 22.5°

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Brix. Vintage 1999 was cool. Harvest dates were as much as two weeks later, and desired flavors did not develop until 23.5° Brix.

Assuming sugar is above 22° Brix, taste of the fruit and balanced acidity are the picking parameters used by Killian.

Hinchliffe reports that there is more hang time latitude when producing a barrel-fermented style. Tank ferments are out of balance — ethanol will be too high and acids too low — if grapes are picked at 24° Brix, even if it takes that level to achieve flavors.

Because barrel-fermented wines are significantly richer, sugars can reach 24° Brix if that's what it takes to develop flavors in the vineyard.

Bevill contends that he bases his farming plans on an expectation of 45 days from veraison to harvest. Others agree that six weeks is a good planning window.

Beaulac believes that with Sauvignon Blanc, more than any other grape, ambient temperature at time of harvest is important. Picking when the temperatures are in the 70s and low 80s is far too warm, because fruit characters are reduced and heat increases the phenolic level in the juice. Ideally, he wants to pick at night.

Hinchliffe reports that Hanna has gone to hand-picking at night. He agrees that phenolic levels increase at higher temperatures, which makes the juice, and ultimately the wine, bitter. The only way to correct this bitterness is to leave the wine with some residual sugar — a solution he rejects.

"We're trying to avoid the phenolic pickup of the destemming operation by going straight to press with whole cluster fruit," Munksgard says. "I also don't want to have to wrestle with the negative consequences of higher solids that comes from destemmed grapes. As grapes warm during the day, they become softer and thus create higher solids.

"The important element is finding an acceptable middle ground between what our ideals are and what we actually receive. It's always a matter of how fast we can get grapes off the vine and into the winery.

"I'm always in conflict over higher alcohols. Most often, mature flavors come only at higher Brix levels. To get greater flavor, we sometimes have alcohols that are a bit higher than we would prefer. Barrel fermentation is a part of our style. I'd like to introduce some stainless fermentation, but not so much as to compromise the style."

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Blending varietals

Participants who use blending varietals maintain that such use is not determined by how Sauvignon Blanc is grown or by what flavors predominate at harvest.

Markham blends Sauvignon Blanc with Sauvignon Musqué and Semillon. Killian blends up to 10% Chardonnay because the winery does not source Semillon, a blending varietal that adds mouthfeel, middle body, and fleshing out.

The Chateau Ste. Michelle bottling is blended with 10% to 15% Semillon. Olsen likes the blend because it softens the wine, adds richness to the mid-palate, enhances aromatics with a lemon drop, citrus character, in addition to taming any aggressive herbalness that may be present in the Sauvignon Blanc. He adds that Semillon develops well in a cooler year. In such vintages, Semillon can go to the maximum of 25% of the blend.

Munskgard likes the floral tones that blending Viognier adds to Sauvignon Blanc. At 20%, it also extends the mouthfeel and structure. Beaulac suggests that the floral aspect is the reason Markham chooses to add Sauvignon Musqué.

Skin contact

Chateau Ste. Michelle machine harvests at night which eliminates whole clusters as an option. However, whole berries are not crushed, and they go direct to the press.

Much of Geyser Peak's fruit is machine-harvested at night and therefore gets some skin contact. Schroeter says he understands that skin contact has gone out of vogue, but he believes the few hours night-harvest berries get in the truck are beneficial.

"If it's a year with minimal botrytis and if grapes are picked cool, there are added benefits from skin contact," McBride adds. "I view it as a cold soak tea bag offering huge extraction of grape characteristics from flavor of fruit to phenolic compounds. I prefer having certain hand-harvested lots that have this extraction — even bitterness, which can be chipped away later in the cellar."

Killian works on the other end of the spectrum. He prefers to get the fruit to the right flavor profile before picking and to minimize skin contact as much as possible. "I find Sauvignon Blanc an aggressively phenolic and bitter white variety," he contends. "I try to make the juice more delicate rather than phenolic, and we're also sensitive to juice oxidation, so we go whole cluster direct to press."

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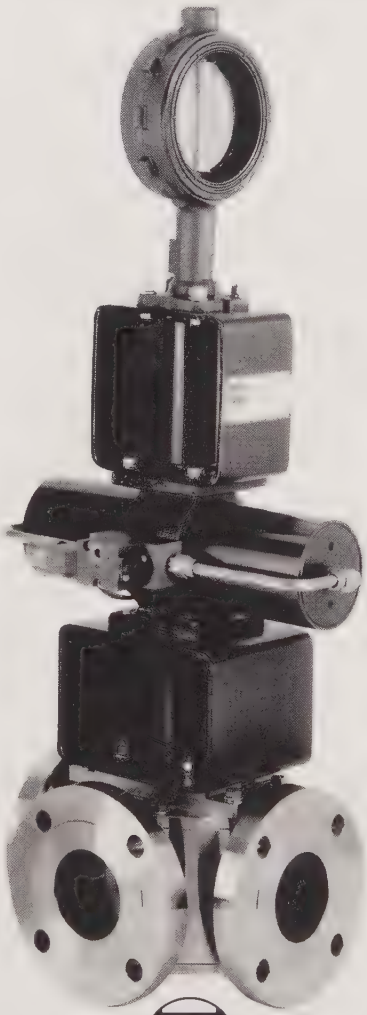

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Juice oxidation

In the cellar, Munksgard considers Sauvignon Blanc significantly more sensitive to oxidation than Chardonnay — not as sensitive as Viognier, but close.

"I do not protect the juice from oxygen," he reports. "I think Sauvignon Blanc juice, especially at the higher Brix levels I'm working with, needs a fair amount of aeration at yeasting for the yeast to build thicker cell membranes. Without this aeration, the yeast might struggle to complete the fermentation.

"Providing yeast with the O_2 it needs also promotes better overall aromas. After fermentation, nix on the O_2. I've tried to measure ppm of O_2, but juice is harder to measure than wine for some reason, and I don't understand all the enzymatic relations to this."

Olsen adds, "If you have a reductive juice, and it's protected from O_2 its whole life, the wine will pink. That's the wrong way to go. But I agree, Sauvignon Blanc must be protected from O_2 once it is fermented."

Schroeter maintains that 30 ppm SO_2 protection before pressing retains desired varietal characteristics. He prefers less browning in Sauvignon Blanc juice than in Chardonnay.

Killian adds 40 ppm SO_2 to the juice tank immediately after pressing.

"If whole clusters are pressed, once higher pressures (up to 2 bar) are attained, inevitably there will be brown juice," Hinchliffe adds. "If retaining the press fraction and not having to treat it separately is desired, you might want to add SO_2."

Munksgard believes that treating the press juice separately is a "French thing." "The Bordelais have all these bento-casein compounds they are using. To understand this, we need to consider what their grapes look like at harvest compared to California and Washington grapes. They have rain during the growing season and get botrytis. Generally, we are not troubled by rain and botrytis."

Yeast cultures and inoculation

Hinchliffe inoculates only about half the blend. "As we moved to estate bottling, we looked to develop a unique complexity in the wine," he reports. "Not inoculating was an attempt to capture more complexity.

"Since the grapes are picked cold at night, when the uninoculated juice portion is pressed without SO_2 addition, it's at 45°F to 50°F and takes a week to begin fermenting. There is a difference in the taste of wine in this tank compared to wine that was inoculated with VL-3. We continue to experiment with different yeasts for multiple flavor profiles."

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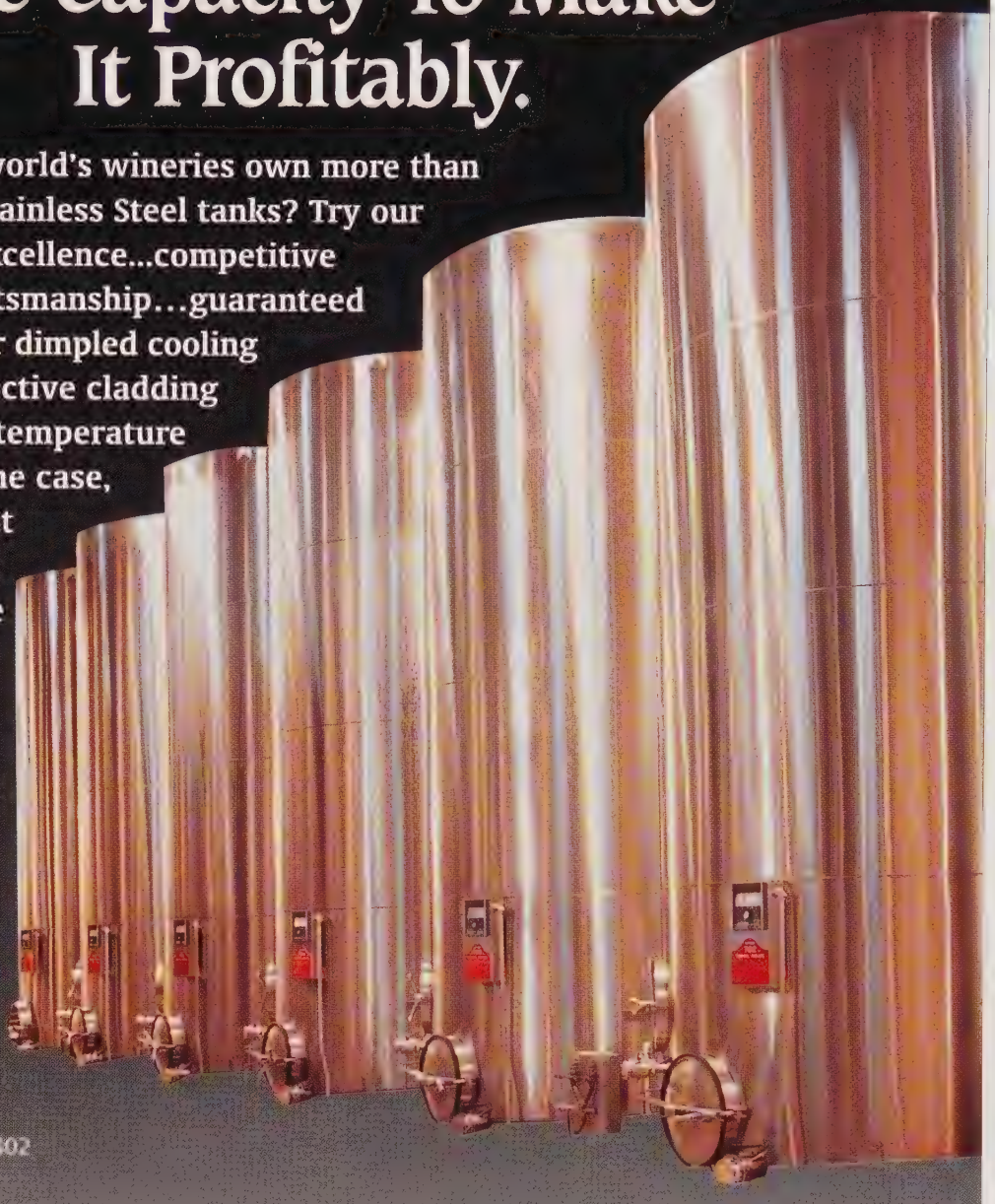

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Other winemakers have tried VL-3, but none consider it the principal yeast of choice. McBride uses Champagne yeast for the DCV3 (a totally stainless steel production bottling) because he is looking for a catalyst yeast that's not going to add expression to the wine. For a barrel-fermented bottling, he uses Prise de Mousse (PdM).

Killian uses both 71-B and VL-3. Iron Horse uses PdM, and Beaulac ferments Sauvignon Musqué with VL-3 and uses PdM for Sauvignon Blanc and Semillon.

After a number of trials with various yeast strains for Geyser Peak's stainless steel production of the variety, Schroeter suggests PdM is no better or worse than any of the others and "gets the job done," converting about 2° Brix per day with maximum fermentation temperature controlled between 55°F and 60°F.

Olsen ferments 95% of the wine with PdM and uses Epernay II for the balance, which ferments slowly and can end up with some sweetness that he considers a blending asset. It also produces higher VA, which helps lift aromatics.

"I keep the percentage fermented with Epernay II small, because I never know when it's going to stick," Olsen contends. "But overall, it has been a positive."

Fermentation in tank or barrel?

A winemaker's decision to ferment totally in tank or barrel is a matter of style. Some wineries, such as Hanna and Dry Creek Vineyard, make both styles.

"There's significant variability among the barrel-fermented styles," Killian comments. "One might automatically conclude that a barrel-fermented style is lots of new oak and some MLF. That's not the case for Chateau Souverain, although the wine is totally fermented in barrel.

"It's a barrel style designed to be like a warm tank-fermented wine, but with a more glycerol-generated mouthfeel. Barrels are on average two years old, and it's the lees contact, with a little bit of stirring and no MLF, that impacts the style."

Barrel fermenting in one-third new French oak cooperage, as is the case with Chateau Ste. Michelle, creates yet another style. "We believe we have fruit characters that can stand up to some new oak, and they come together to complement each other," Olsen explains.

Malolactic or not?

One of the reasons Hinchliffe does not inoculate a portion of the blend is because MLF is encouraged to occur simultaneously with the alcoholic fermentation.

To have this happen, Hinchliffe adjusts malic and the tartaric acid by taste if nec-

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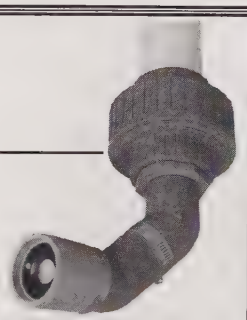

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essary to about 0.80 TA. Further adjustments with malic acid may also be done post-fermentation as needed.

"MLF is bad for our tank-fermented style, because it makes the wine flaccid with a loss of crispness," he notes. At the same time, MLF is also beneficial for the length of the wine in a tank-fermented style, which without it, can be somewhat short and bitter.

While Beaulac does not allow Markham's Sauvignon Blanc to undergo MLF, he does boost the malic acid concentration by taste, when necessary.

"It's a balancing act, and we're doing it for mouthfeel more than anything else," explains Hinchliffe.

Sauvignon Blanc's zesty core

If a crisper style is desired, these winemakers prefer not to have the wine undergo MLF. Olsen believes he attains crispness with breadth of palate by blending with Semillon.

"Knowing that we will blend with Viognier, we're able to carry higher levels of total acidity, sometimes as much as 0.25 malic in the Sauvignon Blanc," Munksgard adds. "Viognier has lower acidity. Barrel-fermentation and *sur lies* will add a softness and fullness to the wine; all of this allows you to carry a wine with higher total acid, and higher malic levels, without underoing MLF."

At Dry Creek Vineyards, 85% of the total Sauvignon Blanc production is tank-fermented with a small amount of neutral barrel ageing without lees contact. Solids levels are very low (2% or less) during fermentation.

For the Reserve or barrel-fermented style, grapes are picked much riper to give the wine floral aromatics and melon-like flavors. "But I look for a higher malic acid content (minimum 0.25 to 0.30 g/100ml) from vineyard sources used for the barrel-fermented style," McBride explains.

"At maturity, you can taste the grapes with higher malic acid in the vineyard. They have more melon character, rather than herbaceous qualities. While it varies with each vintage, high end malic acid in Sauvignon Blanc is about 0 to 0.30 out of a 0.80 TA expressed as g/100ml. The more exposed the fruit is on the vine and the warmer the climate, the less malic acid is available at harvest."

Does zesty Sauvignon Blanc come down to malic acid content? Independent of style, malic acid seems to be the factor that many consumers are looking for in Sauvignon Blanc today. ■

PWV thanks Dry Creek Vineyards for hosting the discussion/tasting.

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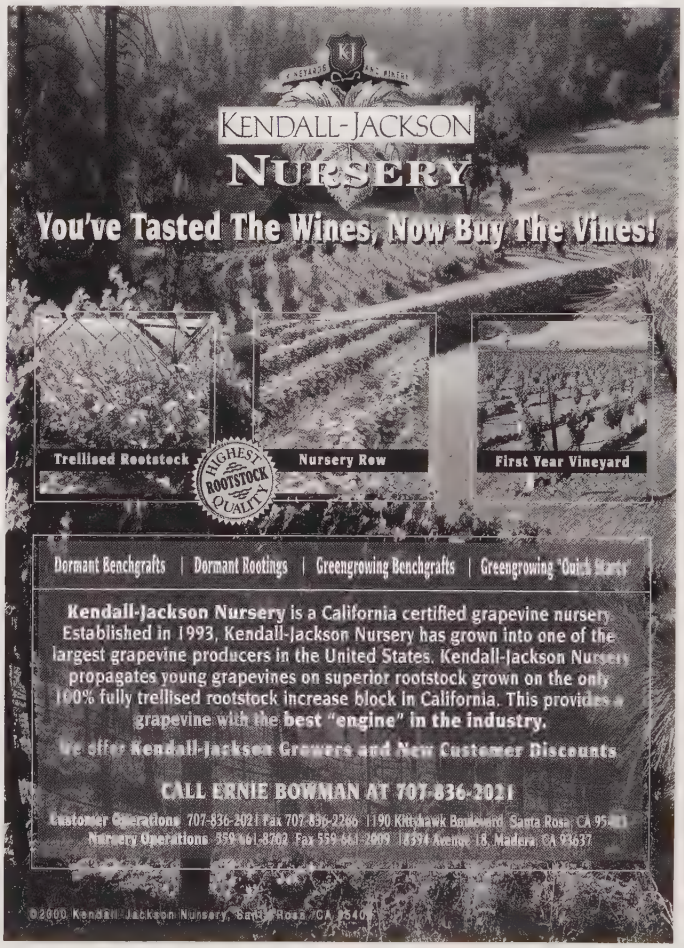
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Crafting Sauvignon Blanc

Defining the inimitable Marlborough style

BY Eleanor & Ray Heald
Contributing editors

Bold, assertive wines with bright varietal fruit and natural high acidity characterize New Zealand Sauvignon Blanc from the Marlborough area. These wines are zesty with grapefruit, lemon, and lime characters. Strong, dominant regional flavors, such as gooseberry and passion fruit, build on a vibrant structure. That's the inimitable Marlborough style.

"We do not shy away from the term grassy as a broad descriptor," says Yolyn Goldschmidt. "Traditionally, we also use asparagus and cat's piss, but this may be a mistake. Americans, especially, are looking for fruit flavors, even from cooler regions and we should emphasize these. We try to let the fruit hang as long as possible to develop a broad spectrum of fruit characters.

"For flavor maturity, the Marlborough region requires at least 120 days from flowering to harvest and 45 days from veraison to harvest."

PARTICIPATING PRODUCERS:

Jeff Clarke, chief winemaker
Brancott Vineyards
Marlborough, NZ

James Healy, oenologist
Cloudy Bay Vineyards
Marlborough, NZ

Yolyn Goldschmidt, winemaker
Goldschmidt Vineyards
Marlborough, NZ

Claire and Mike Allan, winemakers
Huia Vineyards
Marlborough, NZ

Without doubt, the Marlborough climate is cool, with an average temperature of 64°F during the hottest month (February). Located at the northeastern tip of the South Island, Marlborough is at the lower end of the temperature spectrum among the major grapegrowing regions of the world. Abundant sunshine and a relatively dry summer make Marlborough unique. On average, there are 2,395 sunshine hours and 1,181 growing degree days.

With an annual rainfall of 34 inches, most of which falls outside the growing season, a long hang time is generally possible. Long, cool nights allow a slow maturation process.

To showcase varietal Sauvignon Blanc characters, Marlborough producers use oak more judiciously than many other wine regions of the world where the varietal does well. To keep crispness, they shy away from malolactic fermentation.

Brief history

Montana Wines, the parent company of Brancott Vineyards, was established and run as a small vineyard operation (on the north island), until incorporated in 1961. By 1973, the company was looking to expand. In a bold move at the time, it established the first vineyard in Marlborough, traditionally a sheep farming area.

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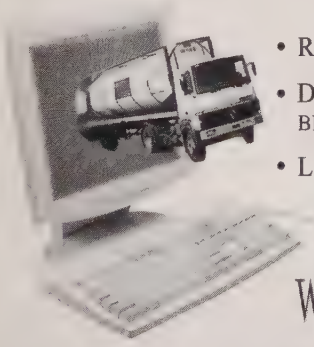

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Although treated with skepticism then, the move has proved to be visionary as other wineries have found success with Marlborough Sauvignon Blanc.

Vineyards

Grapes for Brancott Vineyards Reserve Sauvignon Blanc are harvested from the Brancott Estate vineyard on the southeastern side of the Wairau Valley of Marlborough, which is protected by mountain ranges on the north, west, and south. Brancott Estate occupies a small side valley off the Wairua called Brancott Valley. It faces north and receives abundant sunshine.

Vineyard soils, derived from glacial outwash material, are generally silt loam, overlying gravel, and rocks. Low in fertility, these soils also have low water-holding capacity.

Most vines at Brancott are spaced 3.0 x 1.8 meters (730 vines per acre). Newer plantings are 2.4 x 1.8 meters (940 vines per acre). One-third of the vine rows are oriented north-south and the remainder are oriented east-west. The Scott Henry and VSP trellis are used. Mature vines are pruned with four canes up to approximately 60 nodes per vine.

Sauvignon Blanc vines are normally hedged two or three times during the growing season, the first hedging shortly after flowering.

A number of different cover crops are used to control vigor, depending on soil type, rootstock, and vine age. On a very vigorous site, chicory is used to remove soil moisture faster than might otherwise occur. Chicory also appears to compete very well for nitrogen. On less vigorous soils, fescues are used. There is also a move toward planting mixed permanent swards with various flowering species to attract beneficial insects as an aid to control the Light Brown Apple Moth.

Various leaf removal treatments are used at different times. Leaf removal, along with other canopy management techniques, is used to create and enhance flavor differences among blocks. Early leaf removal with an "Avidor" machine is done four to five weeks after fruitset in some blocks. "Gallagher"-type leaf pluckers are used immediately prior to veraison in other blocks. Leaf removal severity is varied between blocks.

Depending on the vintage, Cloudy Bay Vineyards Sauvignon Blanc is sourced from eight estate and growers' vineyards located in the Rapaura, Fairhall, and Brancott, subregions within the Wairau Valley.

Soils vary from free-draining greywacke gravel in the central valley to finer alluvial loams containing some clay in the southern subregions of Fairhall and Brancott.

The vineyards are planted 1,850 vines per hectare (740 vines per acre). They are trained principally to the Scott Henry trellis system with north-south orientation. Extensive leaf pulling in the fruit zone is done in cooler seasons.

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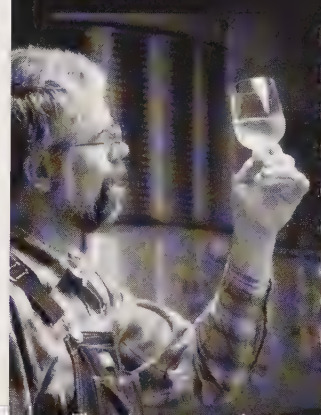

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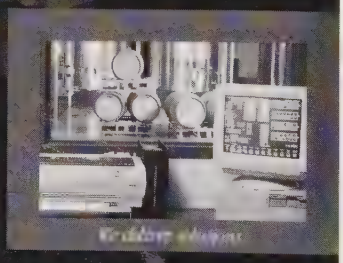

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The Forefathers brand from Goldschmidt Vineyards represents a single vineyard located on the Marlborough bench at 100 feet elevation northwest of Blenheim. Vines on 5-C rootstock and planted in a north-south orientation are 15 years old. Native grass is used as a cover crop.

Gravelly loam is the base for six to eight inches of sandy loam top soil. Vines are trained vertically and arch-cane pruned. Drip irrigation is used all season through to harvest, but is reduced after veraison.

Suckering around the head is done early in the season. Clusters are removed on short shoots. Leaf removal and cluster thinning are done at veraison.

Grapes for Huia Vineyards are sourced from the 8.3ha Allan Estate Vineyard along with a few selected growers in the Wairau Valley. Soils in the vineyards vary from stony riverbed through free-draining loam and river silt to hill slopes and terraces of clay.

Original UCD-1 clonal material was privately imported in the late 1960s and early 1970s. From the original block, a skilled nurseryman made a mass selection and planted another block. A few years of "negative selection" followed, removing sick and virused vines.

In the last few years, Huia has planted clones BDX317 and BDX316 directly from Bordeaux, France. These vines have low herbaceous character and pronounced ripe fruit flavors.

The planting density for north-south oriented rows is 1,851 vines/ha (750vines/acre). A standard vertical trellis is employed with Scott-Henry in the coolest areas.

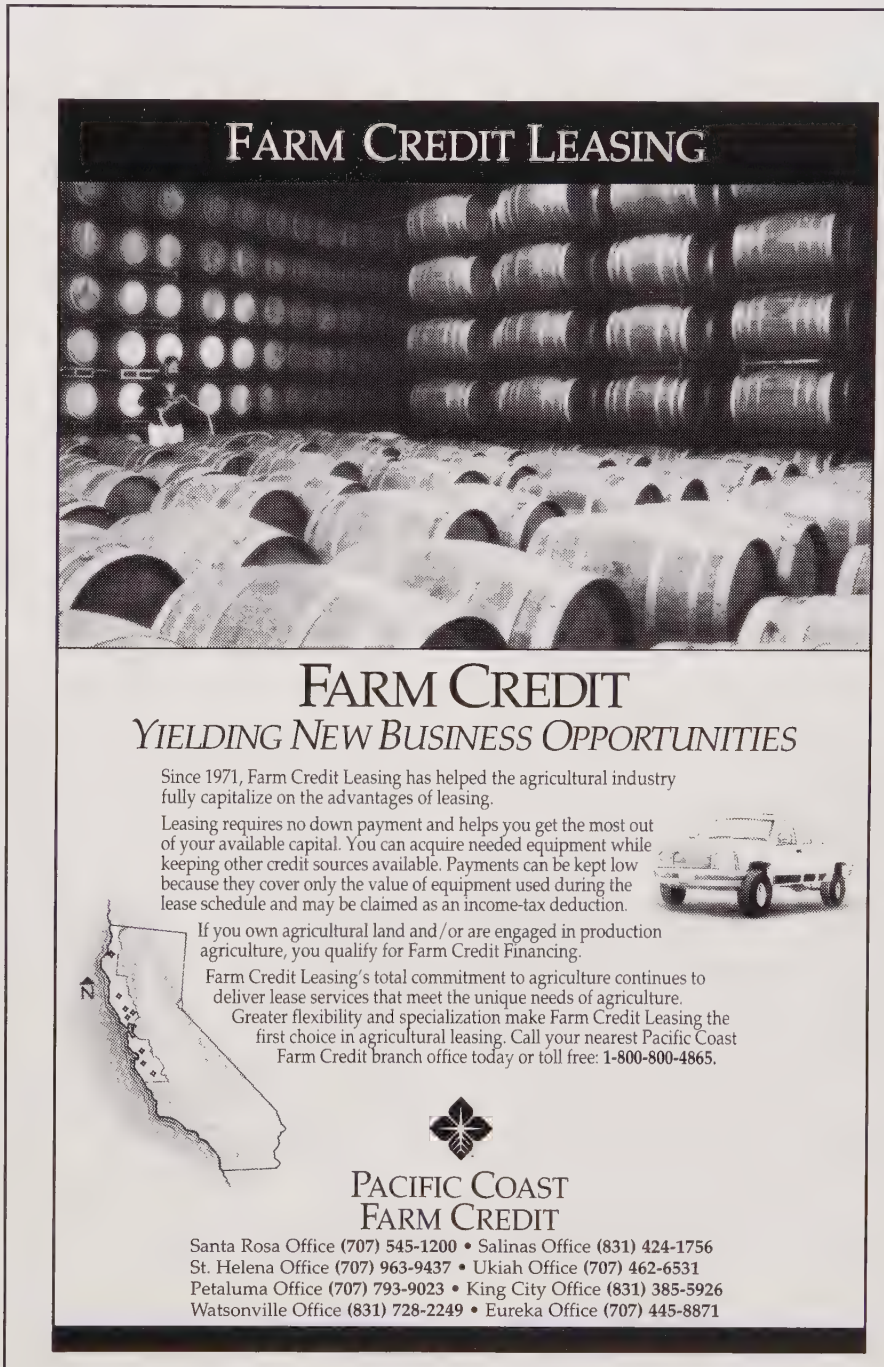
Vines are cane-pruned to a maximum of four canes with 40 nodes per vine. Depending on vigor, vines are hedged up to three times in the growing season. If necessary, leaves are removed in the fruit zone in December or January.

The Huia 1999 Sauvignon Blanc was harvested in three separate portions. A gravely block on Rapaura Road at the Huia Vineyard ripened early as usual and was hand picked on March 26. The first crop of Sauvignon Blanc off the Black Dog Vineyard was hand-picked the next day. On April 1, the remainder of the Huia Vineyard was machine-harvested.

The combined Brix level from the total harvest was 22° Brix.

Hand-picked grapes are whole bunch pressed and machine-harvested grapes are crushed and pressed. Hand-picked grapes are dosed with 30 ppm SO_2 at the press. For machine-picked fruit, 100g/ton KMBS is added to the gondola plus 30 to 250 ppm per ton at pressing.

Juice is settled 24 hours at 10°C (50°F). Some tanks are uninoculated and others are inoculated with D47 or Prise de Mousse (PDM). Press juice is not used.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For added richness and flavor, juice from hand-picked grapes is fermented in 75hl Seguin Moreau oak vats. Juice from the machine-harvested grapes undergoes a long, cool, stainless steel tank fermentation between 12°C to 14°C (54°F to 57°F) for 21 days.

Wine does not undergo MLF and remains on the lees for three months. Lees for wine in oak vats is stirred monthly. Wine is bottled four months after fermentation completes.

Harvest and winemaking

In early to mid-April, Brancott vineyards are machine-harvested. Grapes between 21° and 22.5° Brix are crushed, and left with skins overnight to maximize flavor extraction and provide strength and fullness of flavor.

SO_2 (20 ppm) is added to grapes in gondolas in the vineyard and 40 ppm SO_2 is added at the crusher. Free-run juice is drained and fermented slowly at cool temperatures between 11°C to 12°C (52°F to 54°F) to retain distinctive regional and varietal characters. Press juice is not retained.

Both EC1118 and CY3079 yeast are used in an approximate 30-day fermentation where the maximum fermentation temperature reaches 14°C (57°F).

After fermentation, the 1999 Brancott Reserve did not undergo MLF, had no less contact, or oak ageing. The wine was bottled two months after completing fermentation.

At Cloudy Bay Vineyards, fruit is machine-harvested at night and in the early morning, then transported directly to the winery. Harvest windows are 21° to 23° Brix, 0.80 to 0.90 TA, and 3.0 to 3.2 pH. Vine condition and taste of grapes also impact picking decisions.

Grapes are loaded directly into a tank press. Free run and lightly-pressed juice are combined and cold settled for 48 hours, then racked and inoculated with a neutral yeast strain.

Fermentation is primarily in stainless steel tanks with a small portion fermented in 225L barrels (French oak ranging from one to 10 years old). Wine remains in contact with unstirred lees for about four months when it is blended and bottled.

At Goldschmidt Vineyards, grapes are machine-harvested, crushed, and pressed. "Over the past three years, we've learned to really pick on flavor rather than analysis," Goldschmidt reports. "Additionally, we are using less SO_2, none at the crusher, and getting the wine into the bottle earlier, about five months post–harvest."

After 18 to 20 hours settling at 50°F, juice is racked to a stainless steel tank and inoculated with Prise de Mousse (PdM) along with the addition of 250 g/L of DAP.

"We believe that uninoculated fermentation gives more sweat-like characters and complexity,"Goldschmidt explains. "But we want clean aromas for fruit emphasis."

Fermentation, controlled at 30°F completes in 21 to 28 days. For the stylistic advantage of a creamy, round, fuller mouthfeel, and greater complexity, the wine remains on gross lees, stirred every two weeks for 12 weeks. ■

TASTING NOTES

1998 Brancott Reserve Sauvignon Blanc, Marlborough, NZ

Color/Aroma: dried straw; vanilla, nutty, honeydew melon; floral; and complex.

Flavors: fruit driven; melon forward; very developed ripe flavors; almost honeyed; ripe melon/peach; and rich.

Balance/Finish: drying finish; rich, round, and full.

1999 Cloudy Bay Sauvignon Blanc, Marlborough, NZ

Color/Aroma: light yellow-green; ripe gooseberry; lemon forward; good expression; fresh grapefruit; grass; slight green bean and asparagus.

Flavors: vegetal-citrus; slight asparagus; grapefruit, lemon, lime; pungent; and herbaceous.

Balance/Finish: balanced acidity; good length; well balanced, but on tart side; and good mid–palate.

1999 Goldschmidt Vineyards, Forefathers Sauvignon Blanc, Marlborough, NZ

Color/Aroma: light yellow; citrus, melon, lightly floral; grapefruit; and lemongrass.

Flavors: fruity, flinty/mineral; lime zest; citrus; lemongrass; and slight mineral.

Balance/Finish: crisp and long; lime; very balanced with good length.

1999 Huia Sauvignon Blanc, Marlborough, NZ

Color/Aroma: greenish-yellow; jalapeno pepper, tanky, herbal, gooseberry; grapefruit; straw; and hay.

Flavors: slightly vegetal, some citrus; lime, jalapeno pepper; melon; honey; and grapefruit.

Balance/Finish: fruity; crisp entry and finish; long; and aggressively lemon/citrus.

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Crafting Sauvignon Blanc

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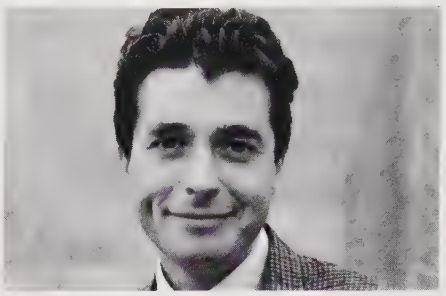


Denis Doubourdieu, University of Bordeaux

BY John Salvi

"Sauvignon Blanc is a challenge. It is as difficult a white wine as Pinot Noir is among red wines," declares Denis Doubourdieu from his laboratory at the University of Bordeaux, where he is on the enology faculty. And he should know. He's made Sauvignon Blanc the focus of his research work.

"Sauvignon Blanc is among those grapes that are sensitive to oxidation and develop thiols (sulfur compounds) during fermentation. It is difficult to vinify. The grapes must be harvested at low temperature (under 68°F) and handled gently.

"Sauvignon Blanc does best in a cool climate and in well-drained soils with high soil-moisture content. It is at its best on clay-calcareous soils, where the acidity in the grapes decreases slowly as they become physiologically ripe. Aromas decrease quickly with a rapid reduction of grape acidity.

"Sauvignon Blanc cannot make fine wine under water-stressed conditions where the temperature is above 30°C to 35°C (86°F to 95°F) during the last three weeks before harvest. A hot climate produces fewer aroma precursors, which means less aroma in the wine.

"In cool climates, such as New Zealand and the center of France (Sancerre and Pouilly-Fumé), climate conditions maximize aromatics."

Soils, rootstock, and clones

Dubourdieu is also concerned about matching rootstock to soil, dictated by soil type and degree of vigor. He suggests 3309 in low calcareous (chalky) soils, 420A in medium calcareous soils, 41B in heavier calcareous soils, and Fercal in the most calcareous.

In low calcareous soils, rootstocks such as 41B or Fercal can be used to slow the vegetative cycle and delay harvest. For example, 3309 is ideal to decrease vigor and achieve an early harvest, but is not suitable in highly calcareous soils.

Depending on soil fertility and planting density, Sauvignon Blanc can support reasonably high yields of 60 hectoliters per hectare in a planting of 5,000 vines per hectare (four pounds per vine).

"There are soils on which Sauvignon Blanc is successful and soils on which it is not," he maintains. "It is vital to choose correctly because, in the wrong soil, there is no 'correct' harvest date. The goal should be 110 days from flowering to harvest, or 40 days from veraison to harvest."

For the best clones, 316, 317, and 108 from the ENTAV collection, must analyses will be less than 3.2 pH, above 8.0 g/L TA, and a potential alcohol under 13%.

Fermentation considerations

Reductive fermentation is paramount. "Avoid all oxidation," he cautions. "Juice must be green, not brown or dark."

Regarding yeast cultures, Dubourdieu touts those that were researched, selected, and propagated at the University of Bordeaux and that are now commercially available.

"Yeasts transform varietal aromas," he continues. "Some are more efficient than others, but if aroma precursors are not available in the grapes, then all the yeast in the world cannot create it. VL3 is the most expressive yeast for Sauvignon Blanc, and VL1 tames aggressive Sauvignon Blanc characters."

Dubourdieu prefers reasonably high (22°C to 23°C or 72°F to 73°F) temperature fermentation. Whether in stainless steel tank or in wood, fermentation must not linger. The yeast must be capable of rapid fermentation, lasting no longer than 10 days.

"Use the least possible new oak during fermentation and ageing or you will lose aromatics which are sensitive to oxidation," he suggests.

Wines that he ferments in stainless steel tanks remain on gross lees, stirred weekly for seven months, followed by bottling. This wine reaches a plateau within three years in the bottle.

Barrel-fermented wines remain on the gross lees, stirred weekly, for seven months. The wine is then racked to tank with the lees, to be bottled within 15 months after harvest. This wine plateaus in the bottle at five to six years.

New oak versus older

Dubourdieu suggests Sauvignon Blanc is "unhappy" in new oak where aromatics will be lost. Keep the oak for Semillon, he advises. Because Sauvignon Blanc is easily oxidized, oak tannins, especially when new, are oxidative. Although they are needed for red wine, they are dangerous for white wines sensitive to oxidation, particularly Sauvignon Blanc.

If oak must be used, then choose older barrels, with the tightest possible grain (not American). If new oak is used, it should be heavy toast because toasting diminishes tannin. These diminished tannins, in turn, will not be as destructive to the aromatics. Interestingly, the same grape on different soils has different degrees of resistance to oak. Intense wine can take more oak.

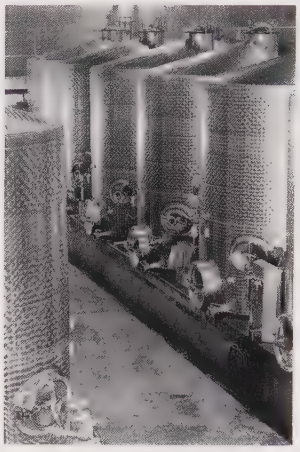
"From harvest to bottling, be careful of oxygen," Dubourdieu repeats. "Use sparingly. Keep the wine reductive. The juice must be protected, so keep free sulfur at least 25 ppm, all with the aim of preserving aromatics."

With this in mind, he suggests that lees are of vital importance for Sauvignon Blanc. Lees are reductive compounds that protect wine from oxidation. They become even more important if Sauvignon Blanc is put into wood. In wood, lees are vital and stirring is hugely protective, so keep the lees and stir as long as possible, weekly in barrel or in tank.

Malolactic fermentation (MLF) is detrimental to Sauvignon Blanc, since it

Continued on page 57

RIEGER



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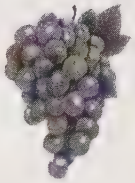

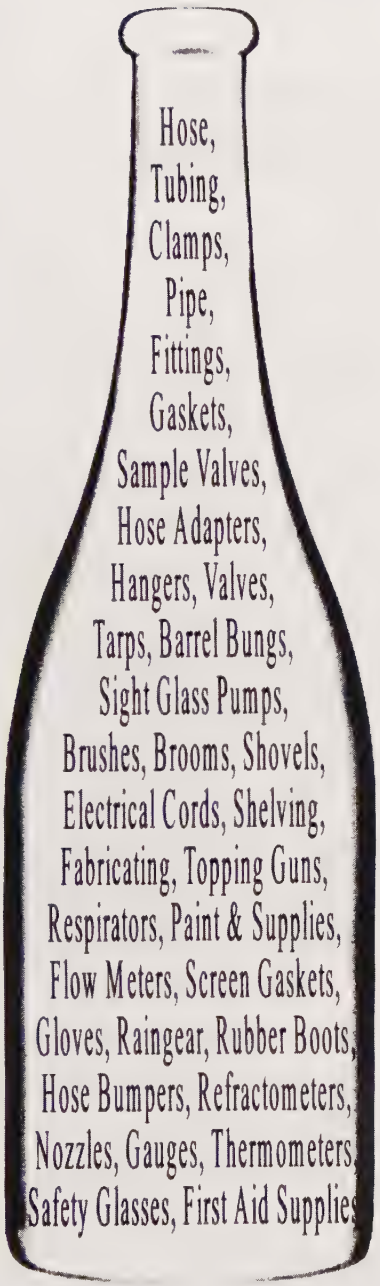

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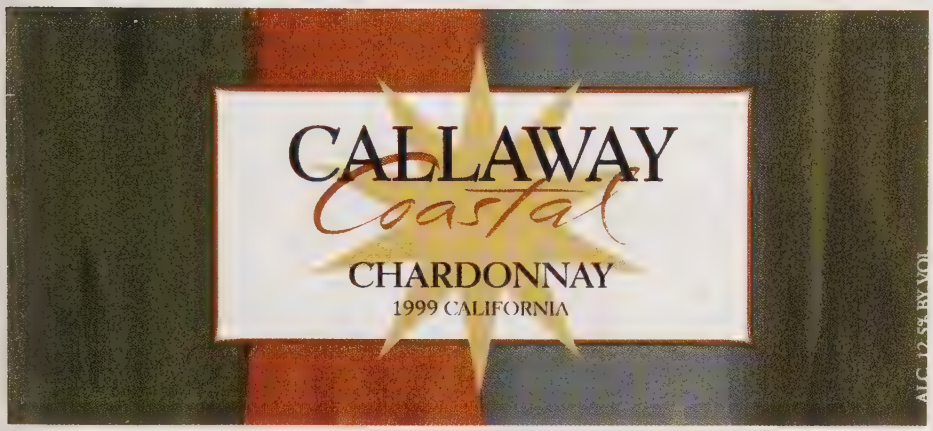
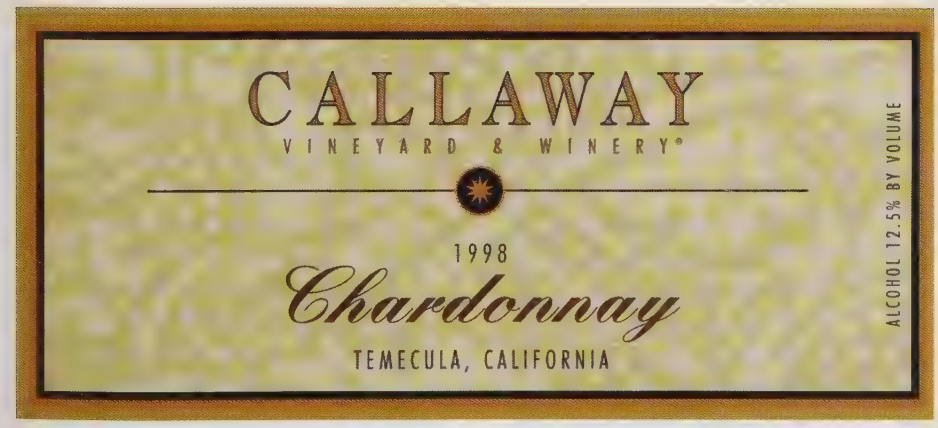
REINVENTING A BRAND

Callaway wines go on "Coastal Standard Time"

BY Andrew Hidas, Associate Editor





Callaway Coastal Winery's new look (right and above top) replaces the old (above), but that's only the beginning.

Reinvention. Politicians do it every day — sometimes several times a day — but their reinventions rarely come even close to having the living substance that goes into a bottle of wine. So when Callaway Vineyard & Winery, the well-known Temecula, California-based brand owned by Allied Domecq Wines, USA, embarked on an overhaul of its entire line this year, the effort, unlike political makeovers, represented much more than an expensive, superficial polishing of its image.

"We've stripped the entire operation right down to the bare bones and are bringing it back to life as something completely new," says Ruth Souroujon, marketing director of Allied Domecq's California brands. "The Callaway that everyone knew is gone. This is a radical reinvention of our brand."

The reinvention is comprehensive — involving geographic, viticultural, stylistic, and image factors. In September, Callaway said good-bye to the "Temecula Valley" appellation on its wines. Callaway has gone "Coastal" by sourcing at least 50% of its grapes from Central Coast growers in Santa Barbara, San Luis Obispo, and Monterey counties. In 2001, the mix will be 70% Central Coast, with Temecula grapes having an even smaller role in succeeding years.

The name will change right along with the grape sourcing — from Callaway Vineyard & Winery to Callaway Coastal Winery.

In addition, the winemaking style itself has changed to a "more contemporary taste profile." For the first time, Callaway Chardonnay has undergone oak enhancement — part of the blend is barrel-fermented and barrel-aged — while its Merlot and Cabernet Sauvignon are "richer, rounder, and more food-friendly," says Souroujon.

Marketing the reinvention

And then there's the marketing.

It starts with the new packaging that aims to be hip and stylish, according to Souroujon. "We've taken our label design cues from architectural, fashion, and high-end retail industries to communicate the lifestyle component of wine," she says.

Callaway's research has shown that consumers like the warm, natural palate of colors like saffron, sage, teal, and okra. "The wine package looks great on a restaurant table or in the kitchen," Souroujon notes.

Talking up a "reinvention," at least in a way that will reach consumers, isn't cheap. Allied Domecq is spending upwards of $4 million to break its new "Callaway Coastal" wines in a national print, TV, radio, and promotional campaign. The effort aims to reach sophisticated consumers who identify with the more informal, relaxed approach Callaway is promoting for wine enjoyment.

To that end, Allied Domecq, which also counts Clos Du Bois, William Hill Winery, and Atlas Peak Vineyards among its California brands, hired Open Minds/The Ponzi Group (Laguna Beach, CA) to create a national ad campaign. The campaign debuted in October, focused mainly on Chicago, Los Angeles, and northern California markets.

Print and radio ads complement an intensive television blitz on the Arts & Entertainment cable channel, which industry research shows wine drinkers watch. Earley & Earley (Half Moon Bay, CA) has designed promotional materials to accompany the campaign theme.

Open Minds, creators of the wildly successful "Budweiser frogs" television campaign, came up with a trademarked "Coastal Standard Time" tagline for Callaway wines. Print ads feature imagery such as four legs (one pair definitely attached to a female, the other not) dangling barefoot from a hammock, with the ocean as backdrop. The headline: "May we suggest a crisp Chardonnay with your stud-muffin?" The inset reads: "4:24 p.m. COASTAL STANDARD TIME™."

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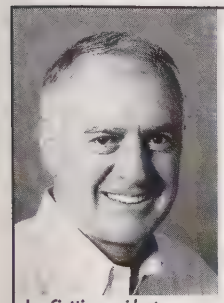
"Our company is completely committed to taking wine off its pedestal," says Souroujon. "We've done a lot of research preceding this brand reinvention, and what consumers have been telling us is that they're intimidated by the wine-buying process, not only by which wine to buy, but which wine with which food, and how to order in restaurants. By using relaxed, informal imagery in our ads, and by pinpointing different times of the day (or night) when you might enjoy wine, we're trying to tell people that wine fits your lifestyle every day.

"To the ongoing dilemma of 'Which wine, when?' we have an ultra-simple answer: 'Drink what you like.' That's why we offer a red and a white option with every one of our recipe suggestions. People need advice, but we're trying to make the process easier, not more difficult."

Moving to "wedge premium"

With its Callaway Coastal line (a Chardonnay, Sauvignon Blanc, Chenin Blanc, Merlot, and Cabernet Sauvignon), Callaway is looking to become one of the dominant players in the "wedge premium" category of wines that fetch $7 to $10 retail, Souroujon says. The category grew a healthy 12.8% from 1998 to 1999, according to Gomberg/Fredrickson, wine industry economic consultants in San Francisco.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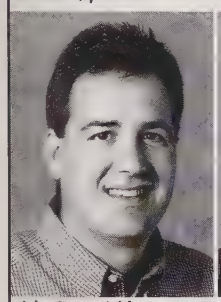
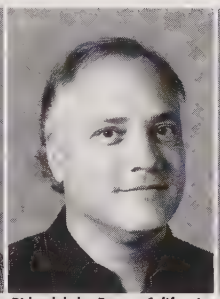

John Ciatti, *California*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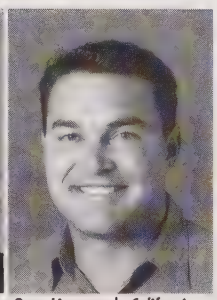
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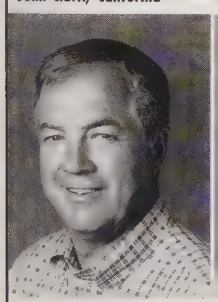
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Andy Bivona, *concentrate*

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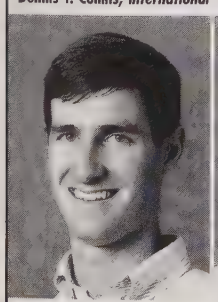
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While the "classic premium" category of $10 to $14 wines grew even more robustly at 14.1% in 1999, the market is about one-third smaller than the wedge premium category. Still, Callaway will also fight the classic premium turf wars with its "Coastal Reserve" label affixed to a Chardonnay, Merlot, and Viognier.

"We're seeing consumers more willing to pay for quality," says Souroujon. "It's a natural progression for people to move up from the 'popular premium' (formerly 'fighting varietal') category of $3 to $7 wines as they become more sophisticated. The bonus for consumers is that the wedge premium category has evolved into better wines over the past few years without going up in price. Having access to plentiful quality grapes is a key to that development."

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Such access shouldn't be a problem on the explosive Central Coast, where eager growers have been busy expanding across the rolling hills of a huge viticultural region. Such wineries as Kendall-Jackson, Mondavi, Beaulieu, Meridian, and Fetzer are already established as major Central Coast players. Now comes Callaway, seeking grapes to fill 250,000 cases in 2000, 350,000 next year, and a projected one million cases by 2008.

"We're keeping all options open with respect to purchases on the Central Coast," says George Rose, Allied Domecq spokesperson. "We've been talking to several growers, exploring a possible purchase of a winery or property to build a winery. We're not sure how it will turn out, but we do know we'll become a major player there. Understandably, the growers are excited."

With so much buzz attending the brand's overhaul, Rose emphasizes that Temecula continues to be a perfectly functional winery that has been damaged but not destroyed by Pierce's disease and the glassy-winged sharpshooter. (See sidebar.) Callaway has crushed Central Coast grapes at custom facilities there and trucked the juice to Temecula for production and bottling. Whether this will continue depends on future decisions about establishing a Central Coast winery.

"Temecula is a very good facility with a well-established presence," Rose says. "More than 120,000 visitors go there every year. To many people in Southern California, Temecula *is* Wine Country."

Given the brand's expansion to the Central Coast, Callaway's winemaker of 19 years, Dwayne Helmuth, won't be able to monitor the bi-regional operation alone. So

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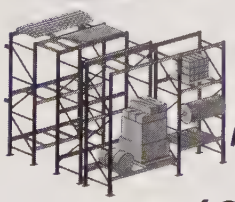

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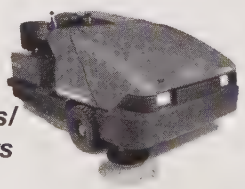

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in May, assistant winemaker Darren Proscal, himself a 15-year veteran of Callaway, was promoted to winemaker.

"Our entire operation is still in an evolutionary phase, but we don't anticipate basing one winemaker in Temecula and the other on the Central Coast," says John Falcone, who joined Callaway in May as general manager. "We have a team approach, with shared responsibilities. Having worked closely together for 15 years, Dwayne and Darren have a pretty good idea of where they want to take the wines.

Quality is the point

"Our timing appears to be really good. There's a lot of excitement on the Central Coast — the tide seems to be turning there. Quality growers now have another major player hunting for the best grapes. But I think volume-minded growers will be hard-pressed. These days, you have to do more than stick vines in the ground. Grape quality will ultimately determine pricing."

What Falcone and the rest of the Callaway/Allied Domecq team also know is that wine quality will be the ultimate judge of this reinvention. In the hot competitive environment the brand is entering on the Central Coast, Callaway wines won't win any kind of sympathy vote as the best little wines Temecula ever produced. But Callaway officials aren't looking for sympathy. They're just looking for more, better, and healthier grapes. ■

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The Callaway of old: Squeezed for grapes and bit by a bug

Prior to its reincarnation in Coastal Standard Time, Callaway Vineyard & Winery had grown to a 250,000-case winery atop a hill in Temecula, a formerly quaint and dusty hamlet in southern California's Riverside County.

Temecula had barely 300 residents in the late 1960s when Ely Callaway (of golf club fame) began searching for a suitable location for a winery. In 1969, he purchased 150 acres in Temecula Valley and began planting vineyards to Sauvignon Blanc, Chenin Blanc, Riesling, Zinfandel, Petite Sirah, and Cabernet Sauvignon. The winery was completed in time for the 1974 harvest.

Today, some 50,000 residents crowd the valley floor, their homes forming a rising sea that is steadily turning vineyards into island greenbelts. Though the market for Callaway wines has grown more or less commensurate with local population growth, three major realities prompted Callaway officials to take a sustained look at the operation — and ultimately to decide that nothing less than a complete reinvention would suffice to assure the brand's long-term prosperity.

Those realities were:

1) Persistent consumer and industry resistance to the idea that good wine could come from southern California, despite equally persistent evidence that Callaway presented to the contrary;
2) Massive residential and commercial growth around the winery, which inhibited Callaway's potential for necessary long-term expansion;
3) The 1998 arrival in Callaway Vineyards of the glassy-winged sharpshooter, a wide-ranging pest that spreads the bacteria that causes Pierce's disease.

With Pierce's disease having thus far put some 20% of Callaway's total 720 acres out of production, Allied Domecq wasn't about to wait around to see if it would ultimately claim the remaining acreage. But laying the entire brand reinvention at the feet of the glassy-winged sharpshooter wouldn't be accurate, says spokesperson George Rose.

"Despite media reports that Pierce's disease is the sole reason for Callaway becoming a coastal brand, the truth is the move to coastal fruit would have occurred anyway," Rose explains. "The brand had been languishing, not living up to its potential. When consumers found Callaway, they loved it, but it was difficult to combat the perennial attitude about wines from Temecula.

"Then there was the grape-sourcing problem. Stand on the steps of the winery, and you'll see homes everywhere. We were expanding and we needed access to quality grapes. There was a very serious question whether we could get enough grapes from Temecula, and the Central Coast was here, just waiting for us. Then the sharpshooter appeared and sped up our timeline. But we would have become a coastal wine brand at some point in time."

Rose also notes that Pierce's disease is not new and is not limited to the affected acreage in Temecula. "It was originally known as Anaheim's disease, because it pretty much wiped out the Orange County citrus industry at the turn of the last century," Rose says. "It also attacks almonds, ornamental flowers, even the oleanders that line most California freeways.

"What's new is the glassy-winged sharpshooter as the Pierce's disease vector. It's much more mobile than vectors have been in the past. That's what has everyone concerned. At this point, a solution is in the hands of the scientists." — *Andrew Hidas*

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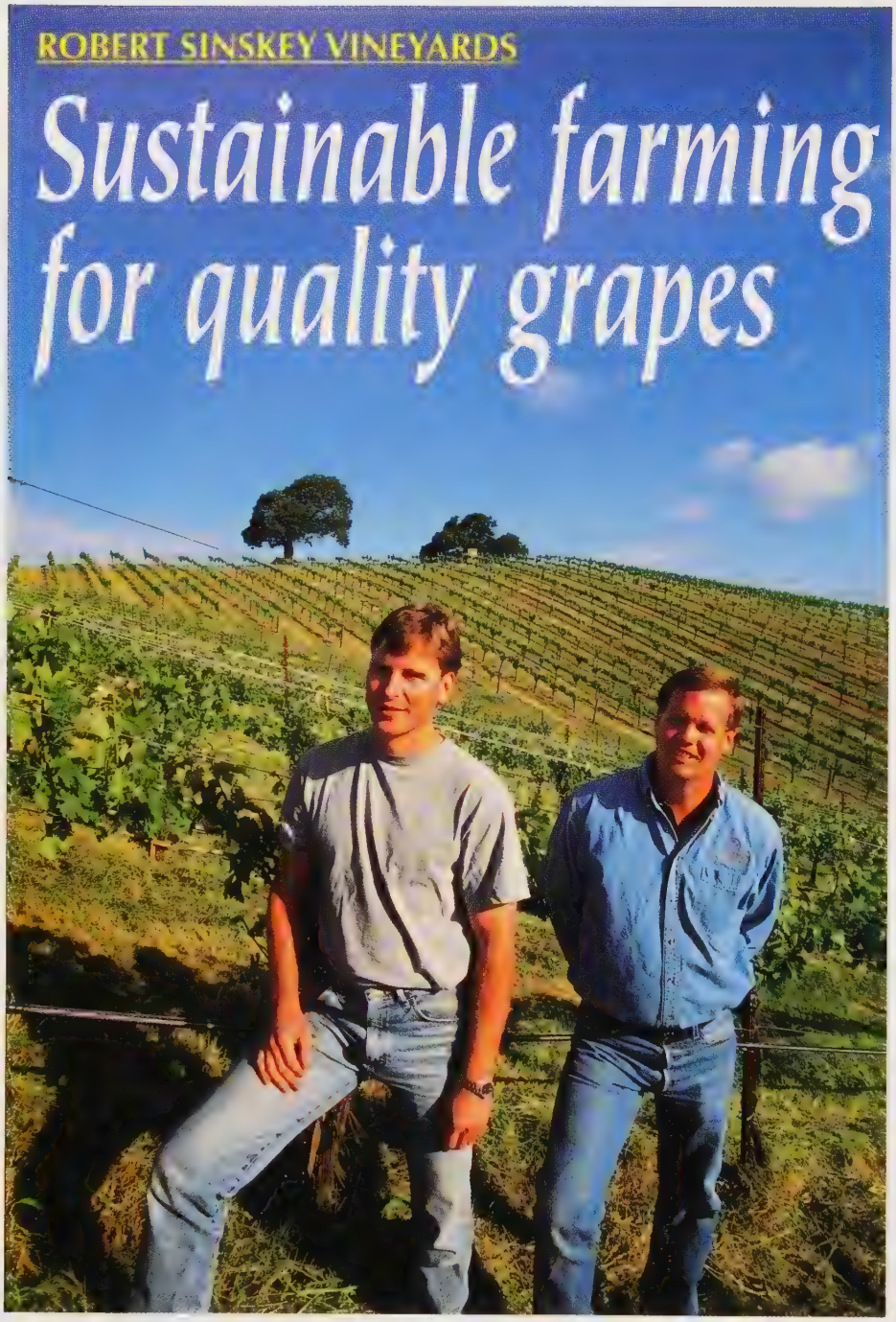

Sustainable farming for quality grapes

Winemaker Jeff Virnig (L) and vineyard manager Kirk Grace (R) in Vandal Vineyard. Photo by Fred Lyon.

BY Susan Diane

A rising tide of vintners and growers believes sustainable agriculture should guide the wine industry. When deciding the direction of their winery in the early 1990s, vintner Robert Sinskey and winemaker Jeff Virnig, at Robert Sinskey Vineyards in Napa Valley, CA, saw sustainability as the best approach to achieve the highest quality grapes from their vineyards. Their research convinced them that this farming strategy would not only produce healthy vines, but would also provide a healthy environment for their vineyard crew and their community.

Virnig began the conversion to sustainable farming by hiring consultants to help him evaluate several vineyards and received good advice and recommendations. His enthusiasm was bolstered by the biodynamic agricultural techniques inspiring his winemaking vision. But implementation was the key, and at that time, it was nearly impossible to find a grapegrower with extensive experience in organic viticulture.

At the time, Sinskey and Virnig were working with an independent vineyard management company that helped begin a conversion, which included extensive cover cropping and reduced synthetic inputs. But as the Sinskey vineyard acreage expanded, the demands of farming at the level of sustainability the winery desired were beyond what the management company could provide. The two realized they needed to form a vineyard team that more closely reflected the winery's farming goals.

Hiring a vineyard manager

Virnig remembered discussing sustainable agriculture with Kirk Grace when Grace worked as vineyard manager at a Napa Valley winery. Grace had left the world of corporate agribusiness and was attending Sonoma State University to pursue an academic life, but Virnig began calling in hopes that he could lure Grace back into the vineyard.

Grace's first response was that he was "out of the wine business." Reluctantly, he finally visited the Sinskey vineyards and listened as the persuasive winemaker explained that he wanted to take the risk to grow sustainably. Virnig offered what Grace really wanted — the opportunity to truly be a farmer. Grace saw that the vineyards could be managed with a garden-quality farming strategy that included the long-term goal of farming organically and, if ultimately possible, biodynamically.

Once Virnig and Grace agreed, they presented their ideas to Sinskey. Brainstorming together, the three developed a statement of their mission and goals, which marked the beginning of one of the most comprehensive examples of effective implementation of sustainable agriculture in Napa Valley (see sidebar: "Sinskey Mission").

ROBERT SINSKEY VINEYARDS

Farming Practices

by Kirk Grace and Robert Sinskey

The mission at Robert Sinskey Vineyards (RSV) is to emphasize the distinct character of a vineyard to grow and make wines that reflect their environment — aka "*terroir*." Our goal is to create a balanced farm environment by:

- employing an ecologically sound, self-supporting farm system,
- farming with minimal adverse environmental impact,
- promoting soil enrichment, conservation, and construction,
- producing fruit of the highest quality.

Farmers work in an environment between wild nature and domestic husbandry. Performance in this environment can be assessed both qualitatively and quantitatively. When decisions are based solely on the quantifiable, the craft of the profession is ignored and the farm loses its uniqueness.

Every vineyard exists under environmental parameters that define its ability to grow and mature fruit. Working within these parameters, not against them, provides an opportunity to deliver grapes of quality and character.

Factors that can't be controlled but can be impacted by farm practices:

Climate: temperature and moisture,

Edaphic or site-specific: soil texture, soil depth, soil chemistry, soil microbiology and terrain.

Farm practice-decisions that are made based on the above factors,

Cultural practices at the time of development: rootstocks, budwood, trellis systems, row direction, plant density, soil preparation, amendments, and irrigation;

Cultural practices from season to season: pruning, irrigation, fertilizers, innoculents, cover crops, mowing, tillage, pest monitoring and canopy management;

Proper assessment of cause and effect in order to avoid crisis management intervention.

RSV uses organic and alternative (biodynamic) techniques for all farm decisions. This approach provides the opportunity to see the farm as an interdependent system of organisms and to see how this system reacts to its environment. It helps us understand cause and effect. This "look deeper" approach trains us to remedy a situation before it becomes symptomatic *and* it helps us avoid the "quick fix" mentality of modern agriculture.

Organic practices are slow to act, but the impact lasts much longer. It is our observation that organic techniques preserve and emphasize, rather than mask characteristics commonly known as *terroir*.

RSV constantly explores the latest research and technology being developed by genuine farmers and the leaders in organic farming. We also play an active role in developing our own specialized equipment that will help us farm with less impact — on the soil, on those who work it, and on those who enjoy what comes from it.

No-formula farming

Grace found that there were few opportunities for mentorship in organic farming, let alone organic winegrowing. Some specific information was available and knowledge was shared among fellow farmers, but there was little comprehensive knowledge. "We used some consultants, primarily Amigo Bob. Two other consultants have brought additional benefit to our program, Alan York and Bob Shaffer. But on a day-to-day basis, there were few people to rely on. I felt that I was alone in this process," Grace admits.

He discovered a world of information about organic and biodynamic

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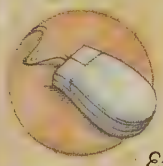

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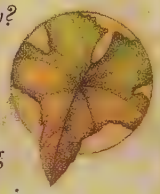

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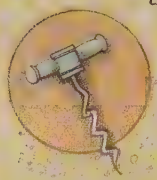

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methods and philosophy on the Internet. "I got answers to my questions by email and by word of mouth, but often that information came from growers in completely different climates and growing situations," Grace says. "Some of the suggestions were not new. Any good conventional farmer is already using techniques like cover crops and pest monitoring. These tools are not unique to organic farming."

The key seemed to be to ask himself, "How will this technique fit into my operation?" Grace also wondered how long he should try various methods before deciding if they did or didn't work? In the end, he relied on logic: If the problem is pests, the solution will take a few days; if it involves soil fertility, it could take years. "I finally settled on a *seat of the pants* technique," he grins.

A believer in passing on information to other farmers, Grace is an active member of the Napa Sustainable Winegrowing Group. He feels that the exchange of ideas and information among winegrowers is critical. "We need scientific data as to why a technique is so important," Grace warns. "Otherwise, we're inclined to snatch up everything that comes out, and there is a lot of snake oil out there."

Sustainable is site-specific

"Another problem is that although details learned about someone else's farm are interesting, they won't necessarily fit in other operations because farming is site-specific," reveals Grace. One of the most important lessons a grower needs to understand is that the reason there is no formula for sustainable agriculture is that the balance of plant diversity or soil fertility or other measures is achieved by responding directly to specific attributes or deficiencies of a particular site.

"Farming should not be over-simplified," says Grace. "Issues are interrelated. Understanding cause and effect is the primary responsibility of a vineyard manager."

Grace's approach to sustainable farming includes a willingness to experiment and persevere until results reveal the desired information. Growers must be willing to try other techniques, keep experimenting until eventually their "formula" will evolve. *PWV* asked Grace to share some details in his vineyard management program.

Soil evaluation and interpretation

At Sinskey Vineyards, soils tests of the top six to seven inches of soil are done every year at roughly the same time in the four ranches.

Grace thinks of the soil as the vineyard's blood: "It's that critical. If you have a healthy soil you have healthy plants, but don't confuse the difference between a healthy soil and an over-vigorous soil." Soil samples are taken after bud break but before bloom when the ground is soft from rainfall but below field capacity and not baked dry in summer. After budbreak but before bloom has proven to be a good time for determining elemental nutrient status; soil amendments are applied in the fall. A total of 25 soil samples are taken from all four ranches, dividing larger blocks into sub-blocks or combining smaller blocks into larger samples.

Soil samples are sent to consultant Neal Kinsey at Kinsey Agricultural Services in Charleston, MO. Kinsey was an apprentice to William Albrecht, PhD, who wrote and taught at the University of Missouri College of Agriculture from the 1920s through the 1960s and was the first to define a soil-specific regime. His detailed descriptions of observations and experiments were published in "The Albrecht Papers." There are no viticulture examples, so a vineyard manager must interpret Albrect's lessons.

For six years, Kinsey has been providing and interpreting results of Sinskey Vineyards' soil tests. Yet, Grace always makes the final interpretation himself. This helps him decide how he can implement Kinsey's recommendations most efficiently.

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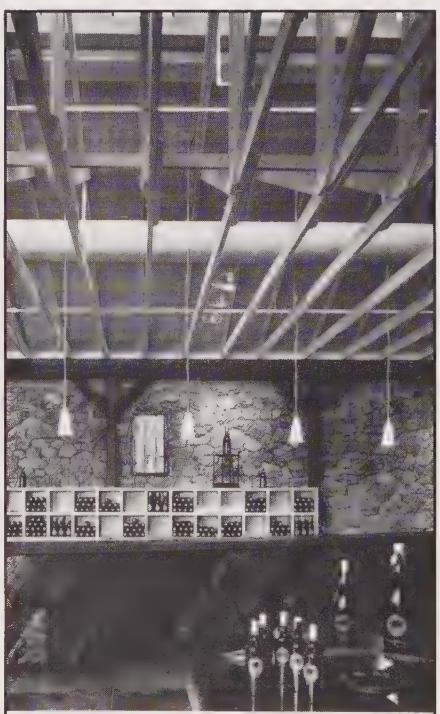

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Resources for sustainable and organic agriculture

Networking among growers and openly sharing information, including personal experience, are two of the most important factors which will positively contribute to the successful growth of organic and sustainable agricultural practices in vineyards. The following resources, which promote open communication between farmers while providing current technical know-how, were recommended by Kirk Grace, vineyard manager at Sinskey Vineyards.

www.biodynamics.com
Biodynamic Farming and Gardening Association, Inc.
Building 1002B, Thoreau Center, The Presidio
PO Box 29135, San Francisco, CA 94129
tel: 888/516-7797, fax: 415/561-7796
biodynamic@aol.com
Book listing, links, journals, newsletter, videos, email discussion groups.

***Biodynamics* magazine**
America's oldest ecological farming and gardening magazine since 1941, published by Biodynamic Farming and Gardening Association.

www.attra.org
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email: sarep@usdavis.edu
Newsletter, book list, websites, magazine, grants.

Napa Soil Survey Online
www.ca.nrcs.usda.gov/mlra/NapaSS/napass.html
USDA Natural Resources Conservation Service
1303 Jefferson St., Suite 500B, Napa, CA 94559
tel: 707/252-4189
County-wide coverage for download, detailed soil series descriptions, representative soil profiles, engineering classifications, interpretive maps illustrating soil quality features, soil use management and climatic data.

Napa Sustainable Winegrowing Group
www.napanet.net/~nswg
1303 Jefferson Street, Suite 500B
Napa, CA 94559
nswg@napanet.net

Neal Kinsey (consultant)
Kinsey Agricultural Services
RR Box 116, Charleston, MO 63834
tel: 573/683-3880

www.dpla.water.ca.gov/cgi-bin/cimis/cimis/hq/main.pl
California Irrigation Management Information System.
Weather station, publications, explanations of ETO.

www.ipm.ucdavis.edu
University of California Statewide Integrated Pest Management
How to, data bases, resources, funding, links.

www.soilfoodweb.com

Three Tenets of Sustainable Agriculture
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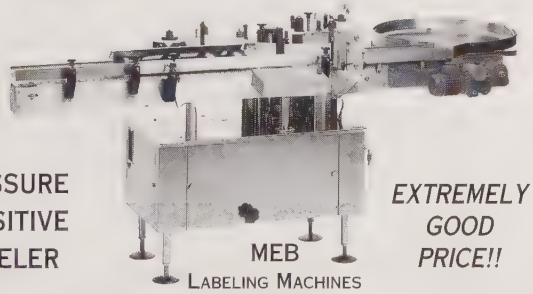

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For example, in 1999 Kinsey recommended applying five pounds of boron per acre, which was applied on all four ranches. For 2000, Kinsey again recommended boron, but Grace hesitated to do so because of vine sensitivity to boron. He decided to not apply it. Later, petiole samples taken at bloom time showed that the vines indeed had adequate amounts of boron, which Grace feels confirms his decision to not apply more.

In contrast, Kinsey's soil reports this year also recommended applying small amounts of potassium sulfate, yet Grace elected to apply it in greater amounts, knowing that potassium is commonly low in Napa vineyards and that potassium ties up in the soil. Petiole samples taken near veraison confirmed low potassium levels in the vines.

Grace explains that when there are good soil organic levels, potassium is more easily available, and he is counting on that factor to make potassium more readily available to the vines. "In this year's samples, soil organic levels were as high as 3.5%, but with the low availability of potassium in the soil, I'm planning to make foliar applications to help supplement the deficiency."

Albrecht found that plant health is not necessarily improved by adding nutrients and fertilizers; it can also be weakened. He determined that the key is to get the soil cation ratios right, and plants will perform at optimum capability in that location.

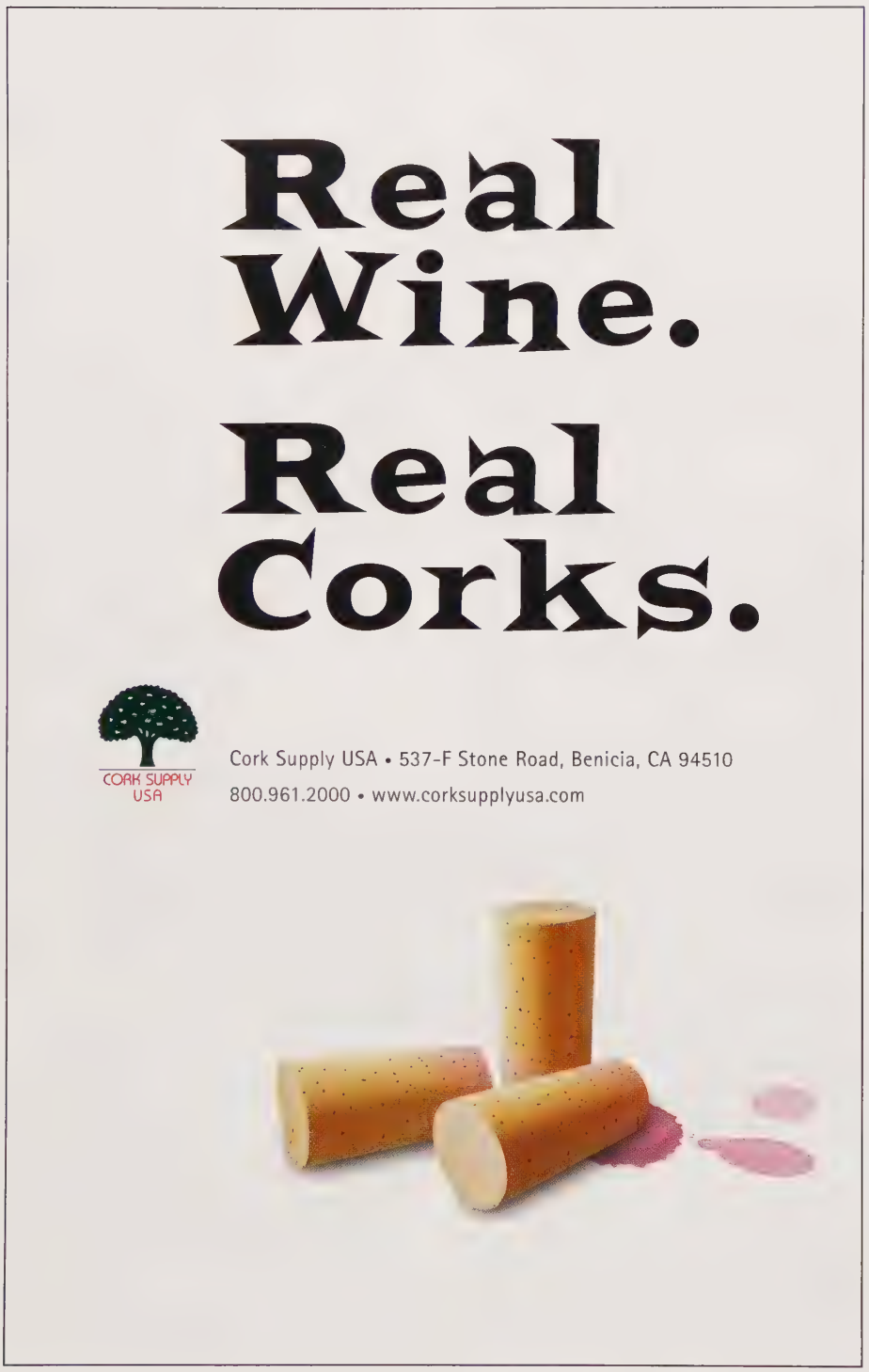
Cation exchange capacity and soil fertility

Cation exchange capacity (CEC) is a measure of the quantity of nutrients that can be held by a soil. The measurement is an expression of the positive ions in the soil. It is an indicator of a soil's potential fertility and is part of a soil test. The bigger the CEC number, the more nutrients the soil can adsorb.

"We've subscribed to a soil model described by Albrecht (and used by Kinsey), which says that positively-charged ions in the soil are supposed to occur in defined ratios," explains Grace. "Dr. Albrecht worked extensively with understanding cation exchange capacity and how nutrient ratios work as a function of CEC."

For example, calcium is commonly deficient in coastal soils. People often look at calcium as something simply to change soil pH, without wondering what its role is nutritionally. Calcium is an essential part of cell wall structure, and its deficiency can result in increased susceptibility to fungal diseases, such as powdery mildew.

Historically, the Sinskey soil tests showed a problem with low calcium. Compost additions, blended with the appropriate form of calcium — mined lime, gypsum, and in rare instances, dolomite — are applied in the fall and have resulted in improved calcium-to-magnesium ratios.



When working to balance calcium and magnesium, the ratio Grace wants to achieve in clay soils is five parts calcium to one part magnesium. In sandier soils, the desired ratio is closer to three to one since the higher magnesium helps maintain soil moisture. He focuses on correcting this ratio in the top six inches of top soil. There are different programs on the four ranches.

At Vandal Vineyard, Grace has the desired 5-to-1 calcium-to-magnesium ratio. Although Kinsey's reports judged the most recent soils analysis to be "a little high in calcium," he does not see it as a problem. Because of a higher gravel and sand component, the Capa Vineyard has a perfect 4-to-1 ratio. The biggest challenge is at the OSR Vineyard where the high clay soil has a 2-to-1 ratio. "We have made additions for two consecutive years and have seen the ratio move up from 1-to-1," reports Grace.

At the Three Amigos Vineyard, the soil tests show a 3-to-1 ratio. Calcium is a relatively slow-acting nutrient, and larger corrections take place over a period of 3+ years. Grace's goal is to improve the balance of calcium and magnesium to 65% to 70% calcium and 10% to 15% magnesium. Again, the variation of calcium and magnesium depends upon the amount of sand, silt, and clay. But, always calcium and magnesium should make up 80% of a soil's CEC, explains Grace.

Grace reports that, when he started working with Albrecht's model, he worried that adding amendments to the soil to assure that cations would occur in defined ratios, might lead to a loss of *terroir*. "Instead, I think I am seeing quite the opposite and feel that we are finding an increase in *terroir*. I think this is because we are only working with the top six inches of soil, and what we are doing is providing an ideal microbial environment, which in turn benefits fertility. This fertility benefits the plants but does not affect the geology of the soil, its unique characteristics. I have no proof but this is the best explanation I've been able to come up with."

Grace believes the soil tests show that the vineyard soils are beginning to come into line with Dr. Albrecht's fertility model. The vines demonstrate a nice balance between foliage and fruit. Even so, Grace says he learned a tough lesson this year: "Even as soil nutrition improves, vine nutrition still needs monitoring. As a result of a June heat spell, some of the weaker parcels showed a lot of stress and stopped growing. It took a while and a lot of networking to find a material to give the vines a push, but I ultimately injected five gallons of molasses per acre followed by a microbial stimulant. The results were great."

Tissue samples are also taken in conjunction with the soil tests at Sinskey Vineyards. Currently, tissue samples help Grace make spot-treat-

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ments to problem areas, but the winery is developing a database to more thoroughly evaluate tissue samples.

Four individual ranches

Grace's cover crop and soil addition regimes for each of the four Sinskey ranches are primarily determined by studying results of soil tests and interpreting vine growth and weed pressure. The following describes each ranch and its regime for 1999 along with the changes made in the year 2000.

At Vandal Vineyard, the soil type is Bressa Dibble. In 1999, this ranch was primarily seeded with subclovers drilled into volunteer vegetation. Two areas that were low in organic matter received vetch seed. Compost additions included four tons per acre (TPA) compost, 0.5 TPA soft rock phosphate, and 1 TPA gypsum. Organic matter was at satisfactory levels in the last soils report, so in 2000, one–half the amount of compost material and almost no gypsum was applied. He also increased potassium, sulfur, copper, and other micronutrient additions at Vandal Ranch as a result of Kinsey's recommendations.

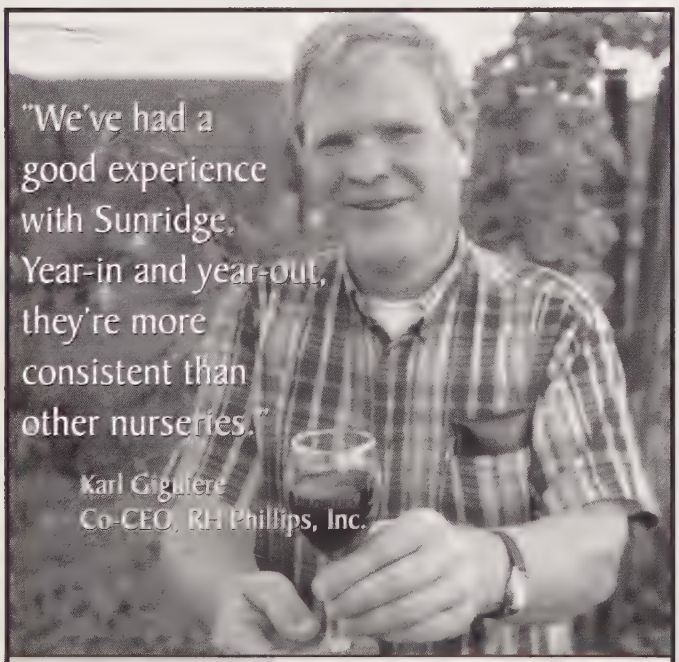
In 1999, Bressa Dibble soils at Capa Ranch were seeded with subclovers drilled and broadcast into volunteer vegetation. Based on the soils report, Grace decided not to apply compost because the levels of organic matter were satisfactory. After the 2000 harvest, plans were to apply 3 TPA of compost on one block, 250 pounds per acre of potassium sulfate to the whole ranch, and 400 pounds per acre of soil sulfur on eight acres of the ranch.

"We are fine tuning in a lot of areas," says Grace, "and it takes a lot of micro-coordinating to get the correct amount of nutrients into the right areas, especially when people are tired after harvest. But at the same time, it is exciting to see results from our efforts. The next challenge after increasing the calcium and phosphorus levels in all our soils is to increase potassium availability."

The OSR Vineyard has Bressa Dibble and Haire soils. In 1999, a mixture of oats and vetch were seeded on the slopes, and subclovers were drilled on the flat areas. Then, additions of 4 TPA of compost and 1 TPA of gypsum were made. "Just by increasing calcium and organic levels on this ranch, we are already seeing less cracking in the high clay soils."

In fall 2000, a high biomass cover crop, including winter peas, vetch, bell beans, and oats, was seeded in every other tractor row and will be spaded in during spring. Alternate tractor rows will be planted to subclover again and mowed in the spring. Because of the high clay content on this ranch, about 4 TPA compost will be applied.

At the Three Amigos Vineyard, all blocks have Haire soils. The Amigo-3 block was seeded with Berseem Clover in 1999. Amigo-1 and Amigo-2 received an oats and vetch mixture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seeded in every other tractor row. Alternate tractor rows were managed with volunteer vegetation. The 1999 compost addition at Amigo-3 was 4 TPA. Amigo-1 and Amigo-2 received 4 TPA compost and 1 TPA gypsum. Before winter 2000, Amigo-1 and Amigo-2 were seeded with the same high biomass cover crop as on Old Sonoma Road in every other tractor row, and alternate tractor rows were seeded with subclover.

Like most vineyardists, Grace plants cover crop in the fall after harvest, since one purpose of cover crop is to protect the ground for the winter. This is especially important where tillage is done. In 1999, a total of 42 acres of Sinskey's 150 acres were tilled.

Grace does not believe that tilling every tractor row is a good idea. Not only can tillage cause losses in organic matter, plus erosion, weed, and soil structure problems, but he also feels that one reason the Sinskey ranches fare well during heat spells is because reflected heat off untilled land is much less than off bare ground.

"I really feel that, in our desire to reduce competition or to have 'picturesque' vineyards, over-tillage is commonplace," Grace contends. "The large area, row-to-row tillage that we commonly see today has only been around for about 150–200 years. One of the main reasons for its success is because it releases fertility. Other benefits include reorganizing soil structure, weed control, and water conservation.

"On the other hand, over-tillage can actually negatively affect these same reasons to till. The Dust Bowl tragedy in the early 1930s is the most dramatic illustration of the impact of over-tillage, but if one looks at current topsoil erosion rates, the decrease in soil organic matter levels, where broadleaf weeds are most abundant, and the problems of massive soil structures — all indications of over-tillage — it becomes evident that it is very important to completely think through your tillage program."

Without herbicides, the undervine competition from weeds is still a problem, and this is one area Grace still wants to improve on, especially in young vineyards. Competition from the cover crop and subsequent weed growth is too great, and he feels non-tillage slows young vine growth too much. "You have to get your vines in production, after all we are in the business of bringing in a crop. Non-tillage in young vineyards delays production by at least a year in our high clay soils. But it was something that we had to prove to ourselves.

"I'm more comfortable customizing each ranch every year," says Grace. "You need to have a clear goal as a base for decisions and to measure your success. We are definitely hap-

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Diversity

Many of Grace's efforts are designed to enhance biological diversity in the vineyard. Compost is applied to add desirable microbial species to the soil and increase fertility. Cover crops are maintained within the cropping system. Plants that border the cropping area, and other plants and animals that exist alongside the primary crop provide diversity.

"Sometimes in the spring, I feel like I'm growing weeds more than I'm growing vines," he jokes. In order to attract more beneficial insects next year, Grace plans to plant wild flower seed blends on row ends. Another thing he would like to do to increase diversity is to bring animals into the farming system. Sheep can be grazed in the winter and chickens can be moved around with portable trailers.

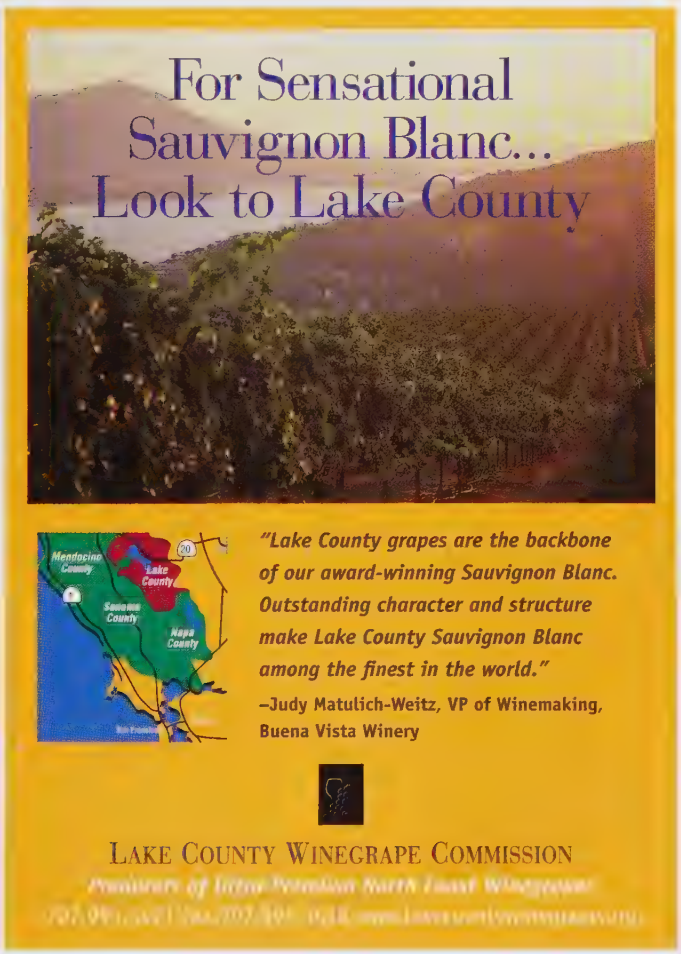
Pest management and disease control

Because most of the Sinskey vineyards are in the Carneros district where powdery mildew is a concern, Grace is uncomfortable risking early infection. The current mildew prevention program includes a rigorous sulfuring schedule. Sulfur is applied at 10 to 12 pounds per acre every seven days, from two to three weeks after bud break until the onset of veraison.

But he is looking for new ways to deal with powdery mildew. "If we don't work together to reduce public criticism over sulfur application and show that we're using other methodology, it will become regulated," warns Grace. "We need to be open to experimentation or we'll lose an essential tool we need to grow grapes."

To that end, he plans to experiment with foliar compost tea. Compost teas deliver balanced nutrition to the vines, increasing resistance to attack from mildew. A secondary effect is that the microbial population in compost tea may also be antagonistic to mildew. Grace believes that, eventually, compost tea will become popular even in conventional agriculture.

Insect pressures at Sinskey Vineyards are minimal, although Grace has spot-treated for leaf hoppers with M-pede with fair to good results. Grace notes that it is important to not use M-pede during high temperatures or too near sulfuring and to time applications when nymphs are not overly mature. Decisions to treat are based on pest monitoring and treatments are avoided as much as possible.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Most improved vineyard

Of the four Sinskey vineyards in Carneros, Capa Ranch has improved the most with organic vineyard management methods.

When Grace first walked the vineyard, planted to Pinot Noir in 1993, it was obvious from the appearance of the vines and the vineyard overall that soil fertility had to be improved. He believed the vines were being asked to do too much with too few resources.

Grace immediately reduced the amount of wood left at pruning to compensate for low fertility soils. He next focused on canopy management, looking to achieve a better balance between foliage and fruit. Because vine growth was slow, he reduced the crop load to one cluster per cane on weaker vines. He also paid careful attention to maintaining the canopy inside the vertical trellis to maximize photosynthesis.

In order to provide for less vigorous vines, Grace designed an intense mowing regime that shifts the cover crop from competing to nurturing plants. Mowing is timed so that desirable plants are encouraged to thrive and competing plants are not allowed to seed, which eventually reduces competition.

According to Virnig, the fruit that is delivered from Capa Ranch is more expressive of the vineyard's *terroir*. In the winemaking, the wine is allowed to evolve on its own, and Virnig is able to make the wine with very little outside influence. Today, the Pinot Noir from this ranch goes into the winery's reserve wine.

Sinskey vineyards today

In 1997, when Grace began managing the Sinskey ranches, he had no equipment (In prior years, the independent vineyard management company used its own equipment on Sinskey vineyards.) and no recordkeeping or research resources. At the outset, 100% of his job was teaching the crew sustainable methods to grow for highest quality.

Today, he manages a vineyard crew of up to 15 (seven full-time) and an assistant researcher. He describes his workload as 20% research, 20% education and teaching, 30% vineyard observation and interpretation, and 30% planning strategy and implementation.

"Any experiment in sustainable or organic vineyard management becomes a part of the library of experience, whether it is successful or not," suggests Grace. "A vineyard manager who wants to farm sustainably or organically must take his time. Many of the techniques we use don't show their results until the following year.

"You can compare this process to learning to fly-fish. One day the wind is coming from your left and just when you master that situation, the wind shifts, making you readjust your entire style. It takes time to build up the library of experience, and even then there's always something new to learn. It gives you an appreciation of what nature has to offer." ■

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PART II

Preparing for the worst

What to do when you lose market position

BY Veronica Barclay

Bouncing back from a tragic loss or winery disaster can test the strength of any vintner's marketing and sales plan. Even in established brands, unforeseen accidents, low tonnage yields, or flawed vintages may result in shortages of bulk or bottled inventories that can seriously affect upcoming new product launches, brand growth strategies, or historically sound sales trends.

As with any "lost" vintage, most producers focus on the financial impact of having no revenue from wine sales available to offset production and operational expenses. However, even when inventory losses are reimbursed by insurance, as described in Part One (Sept/Oct–2000) of this series, a bigger challenge may lie ahead. When a producer loses his or her position in the market for a year or more, a short-term disaster can turn into a long-term nightmare.

This scenario is a reality for several small and emerging new vintners who stored their brands at the Frank-Rombauer wine warehouse in Calistoga, CA. When a fire in June 2000 destroyed approximately 85,000 cases of ultra-premium Napa wines, about 20,000 cases belonged to custom crush clients who cellared, bottled, and shipped their wines from there.

Several of the brand owners made only one wine or had just bottled their first or second vintage of limited production varietals with projected price points between $25 to $125 per bottle. Left without case goods to ship, most of them will suffer more than just an immediate financial loss. They will also lose customers, list placements, and shelf space during the next year as they wait to bottle and distribute their next vintage.

When demand exceeds supply

Losing that three inches of hard-earned retail shelf space can definitely impact future sales. There just isn't enough shelf space available to showcase all of the new labels and line extensions entering the wine arena today. Obtaining a precious cold box placement or aisle end-stack is even more valuable. If the product is not available, there are at least 20 other brands hovering in the wings, ready to pounce on any open space.

Small, new producers often rely heavily on wine-by-the-glass and restaurant wine list placements to help them gain exposure. Customers are eager to try new brands in this environment; they can indulge their curiosity without breaking their piggy banks. Popular restaurants and hotels pour large quantities of these wines per week, and once consumers try a wine they like, they'll ask where they can buy it. This exposure is crucial to many brands.

However, with chalkboards and desktop publishing programs so readily used now, these lists can change quickly, especially when a brand doesn't have enough wine to fill the pipeline. Then it's "out of sight — out of mind."

Shannon Salvestrin of Salvestrin Vineyards in St. Helena, CA, one victim of the Frank-Rombauer fire, is trying to hold her position with on-premise accounts by buying back older and current inventory from her wine retailer customers. By doing this, she hopes to protect her list and glass placements as long as possible, and rebuild her vertical library, which perished in the flames.

When wine is not available, distributors, wine retailers, and on-premise accounts cannot deliver promised allocations or orders to *their* customers. They also suffer lost projected revenues and profits, but unlike producers, they don't have insurance to reimburse them for shortages or losses. Sometimes they can overcome their embarrassment by offering to substitute another brand. Eventually, the frustration of not receiving promised allocations or inventory can lead them to drop the missing wine or the entire vintner's line from their portfolio.

Even the most highly sought after brands and cult wines will lose loyal patrons and enthusiastic would-be customers if the wine is not available for purchase. Winery-direct programs and web sites promoting futures or exclusive wines for "wine club members only" need to have enough inventory available to fill orders or members and on-line shoppers will disappear.

Serious wine collectors may persist in their quest to find the last few bottles of a remaining vintage, but most consumers do not have the time or patience to search around for specific wines. Instead, curiosity and convenience may tempt them to try a new brand when a familiar label is unavailable.

Proactive inventory protection

Vintners can plan ahead to insure a disastrous event won't lead to a prolonged absence in the market when inventory losses occur.

To protect your brand:

- Store bulk inventory and case goods in separate locations. Humidity levels in barrel cellars are not good for cardboard cases anyway. The chance of an accident occurring in both locations at once is slim, and if a disaster happens, either bulk or bottled goods will still be available.
- Bottle twice yearly (winter and summer) to help preserve cash flow for packaging expenses, prepaid taxes, and so on. If you do, case

goods won't be entirely wiped out should a major disaster occur.
- Stagger release dates. For example, release whites in the spring and reds in the fall. Your label and some of the wines will be in targeted markets for part of the fiscal year even if partial inventory is lost.

Duane Dappen, owner and winemaker of D-Cubed Cellars, is a small Napa vintner who makes about 1,000 cases of Zinfandel annually. He only lost 295 cases in the Frank-Rombauer fire, because he had separated his 220 cases of Howell Mountain, June-released Zinfandel from his February release of 800 cases of Napa Valley Zinfandel. As a result, his market presence will not be as seriously affected as other fire loss victims'.

Fortunately, Dappen's Howell Mountain Zinfandel ($30) sells out each year to cult Zinophiles and helps drives sales of the Napa Zinfandel ($24) which follows six months later. Since he had already started shipping some of the Howell Mountain Zinfandel before the fire in mid-June, he expects to only be out of the market a few months, instead of an entire year.

Knowing your customer

Most wineries sell direct to consumers, but a vintner's customer base also includes distributors, brokers, wine retailers, and restaurateurs as well. The wholesaler network has a sincere interest in seeing a brand do well because it means larger profits for them. They make their money through markup of high-priced items that are in demand, or the volume of lower-priced products that are easy to sell. Either way, they require consistent supply of inventory.

When faced with inventory shortages or flawed wines, brands quickly fall out of favor as their demanding customers turn to what *is* available of similar quality or at the same price points.

Rather than lose the order or customer, the wholesaler may offer a competitor's brand instead. By the time the original brand eventually ships product again, the wholesaler's and the consumer's interest has declined. Reviving that interest is sometimes more challenging than the original brand introduction.

Repositioning tactics

When disaster happens, the best tactic is to reposition your wine. Knowing your target customers and their needs is critical to gaining the leverage you'll need to reclaim your market position. The ideal strategy would be to develop the next vintage to appeal to — and expand beyond — your current customer base.

One way to begin this process is by doing market research. You can conduct your own shelf survey at a local fine wine shop by evaluating your competitors' packaging and price points. Watch how customers make

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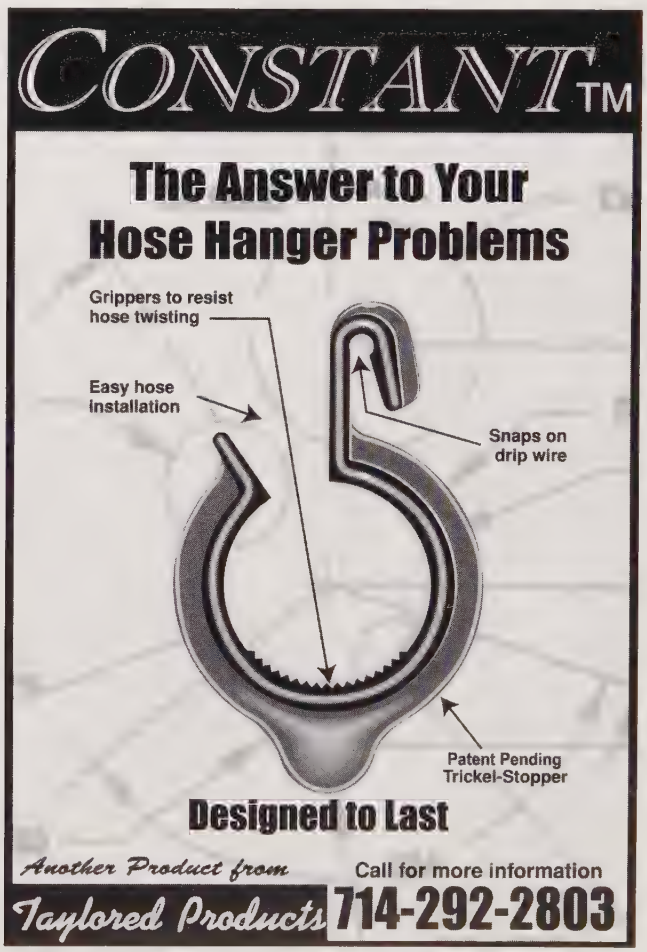

their selections and at what price points they buy. Ask buyers why they bought their particular selection. If they are familiar with your brand, ask what they remember about it.

Their response can help you determine if you share the same target customers, reveal what other choices are available at similar price points, clarify if the wine has package appeal, and confirm if your winery's "story" is reaching the consumer.

Endear your brand to your customers. Personal communication informing distributors, key accounts, and customers of a winery tragedy or inventory loss that is affecting their supply can lead them to support your brand through the bad times. Some may volunteer to generate future sales by developing waiting lists for the anticipated next release.

Your winery story, product benefits (not features), and consistent communications are essential for this "heart share" marketing to become successful. Personal communications through e-mail, postcard mailings, faxes, or phone calls will keep you in the forefront of your customers' minds, even if you temporarily have no inventory to offer them.

In the meantime, active participation in community events, pouring barrel samples of upcoming releases, or creating "invitation only" events at the winery for valued customers are high-profile activities that can preserve business relationships.

If an entire vintage is lost, take the opportunity to upgrade a portion of the next vintage to a reserve level at a higher price point. Create product differentiation or elevate the package design to match the new price point. With only a few seconds to capture a potential customer with your package, effective packaging invites and persuades the customer to grab the wine from the shelf and take it to the register.

This "new product" approach can also offer a vintner positive exposure after a tragic loss to help reach new sales levels, expand the winery's customer base, and obtain additional visibility.

Few people want to be associated with a declining brand, but everybody wants to be part of a successful turnaround. You can help create this success and drive attention to your brand by distributing your own press releases. Deliver newsworthy information and send pre-release samples to key wine trade media in a timely manner.

When published, the increased exposure from these third party endorsements will help your repositioning efforts. Those who are already familiar with your brand will continue to buy it. Those who are discovering your brand for the first time will be tempted to try it.

Repositioning a brand can also be an opportunity to rebond with wholesalers and customers and slip back into their hearts. With their support, you'll be able to capture additional market share. ■

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Unlocking Secrets in Bordeaux
continued from page 34

decreases varietal aroma, Dubourdieu continues. He says there is Sauvignon Blanc made in very hot climates, however, where for lack of taste and aroma, it is best to have wine undergo MLF in new oak in order to inject some alternative flavor and bouquet into the wine.

Aromatic emphasis

"You have realized by now that to me, Sauvignon Blanc is all about aromatics," he notes. "Until recently, only one nuance was really explained — isobutyl methoxypyrazine (IBMP), the bell pepper aroma found in unripe Cabernet Sauvignon or Merlot. Vinification does not transform this, so it is more or less at the same level in the wine as it was in the must.

"However, there are other nuances, feline (cat's piss), boxwood, exotic fruits (gooseberry, grapefruit, guava, and passion fruit), and the burnt (smoky, fumé) in Sauvignon Blanc. We discovered many of them at the beginning of the 1990s, exclusively in my laboratory at the University of Bordeaux."

Dubourdieu cites two published theses: *"L'Arôme et les prècurseurs d'arôme du Sauvignon"* in 1993 by Philippe Darriet, a researcher at Universite de Bordeaux, and *"Recherches sur l'arôme varietal des vines de Vitis Vinifera L.cv. Sauvignon Blanc et son genose a partir de precurseurs inodores du raisin"* by the Japanese researcher Takatoshi Tominaga in 1988, well-known in the analytical research world.

Both researchers found that a sulfur molecule was responsible for the aromatic nuances, and it belonged to a chemical family well-known for aromatic contribution — the mercaptan (thiol) family. Some of these substances were identified and were highly aromatic, even at extremely low levels. The 4MMP (4 mercapto-4-methyl-pentan-2-one) molecule has an aromatic threshold of only 0.1 nanograms/liter. This is found in boxwood. If the boxwood (black currant bud) nuance becomes sufficiently strong, it becomes like cat's piss.

Also identified was 3-Mercaptohexanol, a molecule with a grapefruit zest aroma. It is found in passion fruit and grapefruit juice. There are other molecules in this family, and research continues. Very little of these substances are present in must, which has minimal aroma. They appear during the fermentation as, in fact, do most of the aromatics from the grape.

The big question remains: What are the precursors of these aromas? Even though present in minute quantities, Tominaga identified them. They belong to a new family of precursors: S-cystein-conjugates, which are sulfured amino acids. During fermentation, the precursors are broken down, releasing thiols. This transformation also happens in the mouth when the grape is tasted under the influence of palate enzymes.

Emile Peynaud made the observation of the transformation 20 years ago when he wrote: "The yeast reveals the hidden aroma of the fruit and then the wine has

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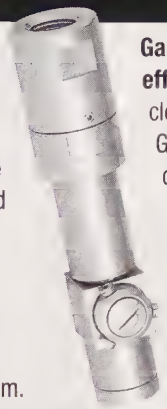

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a grape taste more intense than the grape." This is the first time that hard molecular proof has been found to explain Peynaud's empirical observation.

There are practical consequences of this research. It proves why Sauvignon Blanc is so susceptible to oxidation, and that a reductive fermentation is essential. Sauvignon Blanc aromas are mercaptans which means that they react strongly with heavy metals, especially copper. This is why musts that contain traces of copper give less aromatic wines. This had been observed empirically, but was never explained.

Thiols react violently with quinones. Quinones are oxidized, phenolic compounds which produce oxidized brown must, and therefore diminish aromatic wines. "Green juice, please, not brown," Dubourdieu repeats.

Dubourdieu suggests not pressing above 0.5 bar with minimal tumbling, because there is significant phenolic matter that will oxidize rapidly. Press juice should be treated separately.

More research needed

"I believe there is significant genetic research to be done on Sauvignon Blanc, and that very little has been done so far," Dubourdieu concludes. "To preserve the diversity of the varietal, there is a need for clonal evaluation, especially clones with greater aromatic potential.

"I will personally continue to work on the newly-discovered family of aroma precursors and try to get more fine aromas into my fresh, clean, crisp Sauvignon Blanc. I consider the Sauvignon family my own, representing the work of which I feel most proud. Helping to unlock its secrets is my greatest achievement to date.

"People often ask me about my concept of the perfect Sauvignon Blanc. The answer is easy. My idea of the perfect Sauvignon Blanc is fine gentle lemon-jam on toast without sugar, which can age gracefully and long, taking on the fragrance of truffles." ■

Unified Wine & Grape SYMPOSIUM

Cross-pollination of ideas guides program seminars

The 2001 Unified Wine and Grape Symposium will be held in Sacramento, CA, at the Sacramento Convention Center on Tuesday, January 23, through Thursday, January 25. Organizers promise a program packed with the latest information on issues, trends, and ideas important to everyone in the wine industry in more than 20 seminars. There is an extensive wine industry trade show, with 350 vendors of products, services, and supplies on Wednesday and Thursday.

The cross-pollination of ideas between the industry disciplines of enology, viticulture, and marketing is this year's theme, according to the Unified Symposium Program Chairman Patrick Gleeson of the American Vineyard Foundation.

Program Notes

Tuesday, January 23

Winegrape growers and winemakers from several Pinot Noir-producing regions present a Tuesday morning session, "Pinot Noir: From the vineyard to the bottle." Specific viticultural and enological issues and how these grapegrowing/winemaking teams work together will be discussed. Includes a tasting of presenters' wines.

Genetically modified organisms (GMOs) will be part of a panel presentation of experts discussing the readiness of importers and exporters to accept wine made with grapes and/or yeast from GMOs. Where does the industry stand, and what effect will GMOs have on international wine trade?

Afternoon sessions address business and finance issues in "The legal fight for consumer access" and viticultural issues in "Crop Estimation — Can we improve yield prediction?" In a marketing session, participants will learn how others are "Developing partnerships to maximize marketing dollars" to overcome tight budgets, small staffs, and limited resources. "Sulfide issues" are the topic in the enology session, which will examine the contribution of elemental sulfur applications, vineyard site, and yeast nutrition requirements.

Wednesday, January 24

The Wednesday morning general session will begin with a definitive industry update on supply, market, and sales and then examine the glassy-winged sharpshooter containment program and the threat imposed by Pierce's Disease.

Afternoon breakout sessions include "The world wide web of wine," a discussion of the tools available to wineries and growers to maximize or initiate a successful web presence. "International wine technical barriers" will inform participants about the need for compliance and the resources available to help them comply with rules and regulations in the international market.

"Tannin management in the vineyard/winery" is a two-part session. The vineyard portion will evaluate ripeness indicators with an emphasis on using them in a working environment and will also include a discussion of the grape skin disk evaluation system. The winery portion will look at cap management of red wines and upcoming red winemaking technology.

In "Illusions of value," restaurateurs will look at on-premise pricing and how their clientele react to wine pricing. Two other sessions will look at "Recent advances in grapevine nutrition" and "Winery business models."

Thursday, January 25

On the final day, the morning general session will focus on "Establishing good neighbor and community relations programs," examining whether the industry knows how it is perceived, connecting with community values, and looking at how industry and environmental interests have worked successfully together in other industries. Growth in the industry has brought increased scrutiny and sometimes negative publicity. Top professionals will discuss the situation and share their strategies.

There will also be a presentation in Spanish on "Pest monitoring and pest identification," with a focus on the glassy-winged sharpshooter.

In "Lending practices and valuations" in the afternoon, industry financial experts will discuss how the growing world grape supply is affecting how lenders view winegrape financing and what is happening to vineyard valuations in California and Australia.

Preliminary results of a California economic impact study of Eutypa will be revealed in "Eutypa — Its economic impact and an update on international research and control efforts."

Risks and rewards of "Low-input winemaking" will be the subject of an enology session. Winemakers will discuss techniques and their successes and failures.

Sauvignon Blanc will get a close look from two perspectives: marketing and enology. The marketing portion will look at the styles that consumers prefer, the growth of the market, price points, and "cult" Sauvignon Blancs. A tasting will give participants a chance to taste what they're hearing about. In the enology portion, a New Zealand winemaker and a California winemaker discuss their wine styles, their philosophies, techniques, and their successes. The session will conclude with an exploration of maximizing Sauvignon Blanc varietal character.

LOOKING FOR WINE-RELATED BOOKS?

Use the book order form in this issue.

Handbook of Enology, Vol I
The Microbiology of Wine / Vinifications
P. Ribéreau-Gayon, D. Dubourdieu, B. Donèche, A. Lonvaud
Yeast development, lactic acid bacteria, acetic acid bacteria, use of sulfur dioxide, maturation of grapes, red and white winemaking.
454 pp—$145.00

Handbook of Enology, Vol II
The Chemistry of Wine Stabilization and Treatments
P. Ribéreau-Gayon, Y. Glories and D. Dubourdieu, A. Maujfan
Basic chemistry of wine formation and wine composition. Combines chemical theory with description of day-to-day work in latter stages of winemaking from clarification and stabilization to ageing processes in tanks and barrels.
410pp—$144.00

NEW EDITION
Techniques for Chemical Analysis and Quality Monitoring During Winemaking
Iland, Ewart, Sitters, Markides, and Bruer
Sampling procedures, analytical methods and techniques, stability tests and fining trials for the laboratory.
1 20 pp–$90.00

"Leveraging Success" will look at the dynamics of small wineries and offer insights into the opportunities, challenges, and successes.

Speakers in the "Managing your workforce in competitive times" session will address topics vital to winery and vineyard employers, such as preventing litigation, the Equal Employment Opportunity Act, wage and hour issues, immigration issues, and dealing with labor relations boards.

The viticultural session "Pierce's Disease and GWSS research update" will provide an in-depth examination of future plans to address this disease and its vector.

Don't miss it!

The 2001 Unified Wine and Grape Symposium is jointly sponsored by the American Society of Enology & Viticulture (ASEV) and California Association of Winegrape Growers (CAWG). The Unified Symposium program is developed in cooperation with the American Vintners Association; American Vineyard Foundation; California State University, Fresno; Family Winemakers of California; University of California, Davis; California State Polytechnic University, San Luis Obispo; and the Wine Institute.

Unified Symposium is an excellent opportunity for all members of the industry to increase their knowledge and understanding of industry issues, meet their colleagues, and see what's new at the trade show.

Cost to register for the three-day event is $210 for ASEV/CAWG members, $295 for non-members, or $15 for student members of ASEV. Register by Friday, January 14, 2001. To register or for more information, phone 916/340-1902 or visit the website at www.unifiedsymposium.org ■

Kinsey's Agricultural Services presents

SOIL FERTILITY & WINEGRAPE PRODUCTION

FEBRUARY 12, 13, 14, 2001

8:30 a.m. to 12 noon • 1 p.m. to 5 p.m.

DAY 1: ***Understanding and using the Albrecht Model of soil testing on winegrapes***
- Introduction: Why consider the Albrecht Model in winegrape production?
- Determining capacity of soils growing winegrapes.
- Soil structure and helping it work for you.
- Using soil amendments — the positives and negatives.

DAY 2: ***Determining Soil Fertility needs***
- Sodium excesses and what to consider.
- Dealing with soil compaction.
- Primary nutrients: P-K-S.
- Using compost on winegrapes.
- Nitrogen considerations.

DAY 3: ***The finishing touches for the soil and grapes***
- Micronutrients for winegrapes.
- Correlation by leaf analysis.
- A study of actual soils now producing winegrapes.

PROGRAM WILL INCLUDE SLIDES, OVERHEADS, AND ACTUAL SOILS FROM VARIOUS VINEYARDS FROM MANY LOCATIONS TO DEMONSTRATE KEY POINTS.

LOCATION: The Governors Inn, 210 Richards Blvd. (7th Street / I-5), Sacramento, CA.
REGISTRATION FEE: $350 for clients, $500 for non-clients. To register, contact: Kinsey Agricultural Services, tel: 573/683-3880, fax: 573/683-6227, e-mail: *neal@kinseyag.com,* or visit their website: *www.kinseyag.com*

EQUIPMENT/SUPPLIES

VINEYARD SHOWCASE

EQUIPMENT — tractors, tillers, mowers, sprayers, spreaders, harvesters, hedgers, trailers
FROST PROTECTION — wind machines, sprinklers, weather stations
IRRIGATION— drip hose, clips, emitters, underground hose, sprinklers, pumps, pipes
LABORATORIES— tissue analysis, soil analysis, water analysis
NURSERIES— dormant benchgrafts, green grafts, potted green-growing vines, rootstock, cuttings
SOIL NUTRITION— fertilizers, amendments, cover crops, dispensers, instruments
TRELLIS SUPPLIES— wire, trellis stakes, cross arms, training stakes, tape/ties, fencing
VINEYARD CONSULTANTS— new plantings and on-going consultation

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PW
PRACTICAL WINERY & VINEYARD
NOVEMBER/DECEMBER 2000

VINEYARD WATER SYSTEMS

Vineyard Water Systems specializes in providing grapegrowers with practical solutions to their drip and micro-irrigation challenges. Staff members' experience in the winegrape industry as licensed pest control advisors, certified crop advisors, and certified irrigation designers allows them a unique perspective in irrigated vineyard management.

In addition to helping growers create new projects by providing irrigation designs and bid reviews, they are also able to apply their experience to management of existing systems.

The issues of filter maintenance, fertigation and chemigation, water chemistry, emitter plugging challenges, and system automation are all within the realm of their experience. Both partners of Vineyard Water Systems, Lizanne Wheeler and Patrick Brown, are skilled as bilingual trainers and can provide customized training to vineyard irrigation management teams.

When it comes to addressing the challenges of applying the appropriate amounts of water and nutrients to your vines in a safe and economical manner, you can make your management team the most efficient possible by calling Vineyard Water Systems, the vineyard irrigation specialist.

For more information, contact:

Vineyard Water Systems
521 Lucerne Rd., Cayucos, CA 93430
tel: 805/995-0587; fax: 805/995-0205
website: www.vineyardwater.com

AGRI-ANALYSIS ASSOCIATES

Agri-Analysis Associates provides a comprehensive panel of diagnostic tests to detect viral, bacterial, and fungal pathogens in grapevines. Sensitive and specific assays are available to detect grapevine leafroll-associated virus types, grapevine fanleaf virus, corky bark-associated virus, as well as Pierce's Disease and *Phytophthora spp.*

Information provided by the assays helps nurseries and growers select the best material suitable for propagation. Laboratory confirmation of field diagnosis of diseases provides assurance that the problem is not related to nutrient deficiencies.

Diagnosis and documentation of suspected fungal diseases, such as oak root fungus, *Eutypa*, *Cylindrocarpon*, as well as *Phaeoacremonium*, can also be performed in the Agri-Analysis lab using traditional isolation and identification procedures by qualified and experienced personnel.

Agri-Analysis Associates also provides an isozyme profile analysis on rootstocks using isoelectric focusing that can aid in the diagnosis of production problems in replanted vineyards, often related to the inadvertent use of non-phylloxera-resistant varieties in infested soils. Isozyme profile analysis can definitively compare unknown or questionable rootstock samples to known standard varieties to assure "trueness-to-type" in material to be propagated as well as planted grapevines.

Agri-Analysis Associates can also provide assistance in the design, layout, and analysis of data from field trials. Contract research projects in tissue culture and fungal inoculum production can also be performed in the company's plant pathology laboratory equipped with full-size autoclave and laminar air flow hood for sterile culture handling.

For more information, contact:
Agri-Analysis Associates
Glenn Friebertshauser
45133 County Rd. 32 B, Davis, CA 95616
tel: 530/757-4656; fax: 530/757-4655
e-mail: agrialys@yvm.net
PLEASE SEE AGRI-ANALYSIS' AD, PAGE 57.

CAMERON & CAMERON, INC.

Cameron & Cameron, Inc., differentiates itself with a simple, yet effective business philosophy — provide a quality product at a fair price — and always delivers the highest level of customer service.

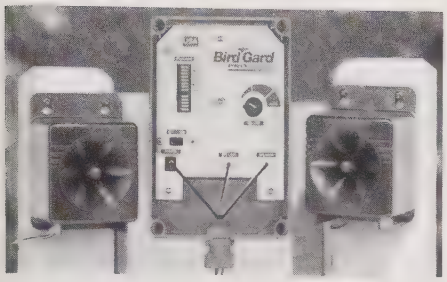
Cameron & Cameron, Inc.
Vineyard & Ranch Supplies
A Sonoma County Agricultural Family Since 1853

Cameron & Cameron, Inc., provides a full selection of quality vineyard trellising supplies to meet the needs of fellow grapegrowers from initial planting through harvest: wood or metal training stakes, metal T-posts, highway stakes, pipe endposts, pressure-treated lodgepole pine endposts, earth anchors, cross-arms, open lyres, trellising hardware, wire, pruning shears, grape knives, picking lugs, and tie tape, plus deer and orchard wire fencing.

Ken Cameron, Gerry Cameron, Chris Lindelof, and Bruce Meinberger are available to service California, Oregon, and Washington.

For more information, contact:
Cameron & Cameron, Inc.
Ken or **Gerry Cameron**
PO Box 52, Fulton, CA 95439
tel: 800/546-7706 or 707/546-7706
fax: 707/546-7759
e-mail: kenc@ccivineyard.com
gerryc@ccivineyard.com
chrisl@ccivinieyard.com
brucem@ccivineyard.com

BIRD GARD/JWB MARKETING



Protect your vineyard from bird damage with the new Bird Gard PRO series that uses digital recordings of bird distress calls. There are three models, each programmable: The PRO Plus covers three acres with two speakers ($250), the Super PRO covers six acres with four speakers ($499), and the new Mega PRO covers 25 acres with a 20-speaker tower and 200 watt amplifier (It's 60 times louder than the Super PRO). It sells for about $1,900 and includes a solar panel.

Each Bird Gard PRO has seven different bird distress calls and a predator alert call, including calls for linnets and starlings. You can program each Bird Gard PRO yourself with a separate dip switch for each call. Choose one, two, or any combination of calls. There are four separate cycle patterns: short, medium, long, and extra-long. Each is totally random so birds won't get accustomed to the calls. Visit www.birddamage.com for more information and a demonstration of the distress calls.

All Bird Gard PROs come with a one-year unconditional money back guarantee and a 10% discount for buying four or more units.

The scare windmill ($59), a visual scare device, has also proven to be very effective for two-acres. It's effective on wild turkeys too. The windmill's three-foot blades are painted with a unique ultraviolet-light reflecting paint that only birds can see. To them, the spinning blades look like a flock of birds taking off in fright, causing other birds to take off, too.

For more information, contact:
Bird Gard/JWB Marketing
Jim Burton
101 Hurlbut St., Westwood, NJ 07675
tel: 800/555-9634
e-mail: birdgard@ix.netcom.com
website: www.birddamage.com

REDWOOD EQUIPMENT, INC.

Redwood Equipment, Inc., is your vineyard equipment specialist.

In March 2000, Redwood became the exclusive northern California dealer for NAIRN Grape Harvesters. Mechanical harvesting is used extensively by Europe's premium wineries. Modern mechanical harvesters can pick at night when grapes are cooler and offer quicker delivery than with hand-picked grapes.

Redwood Equipment is also New Holland's exclusive representative for vineyard and construction equipment, serving customers' needs in Napa, Sonoma, Marin, and Lake counties.

Redwood handles the full range of New Holland wheel and crawler tractors and implements, specializing in vineyard tractors and vineyard crawlers.

New Holland's flagship vineyard tractor is the innovative TN90F. The tight-turning TN90 (and its lower-hp siblings TN65 and TN75) offers excellent maneuverability in narrow vineyard rows. The TN-series also features automatically engaged FWD to maximize pulling power while improving turning and reducing tire wear.

Redwood is also the exclusive dealer for Spectrum electrostatic sprayers for Napa, Solano, Lake, Marin, Sonoma, and Mendocino counties. Electrostatic sprayers significantly improve spraying performance while reducing the cost per acre for materials and labor.

Redwood Equipment provides the full range of services today's grapegrower needs: parts delivery, in-field service trucks, full shop facility, short- or long-term tractor and equipment rentals, new and used sales, leasing, harvest leasing, and assistance with equipment selection for unusual applications.

Redwood staff offers decades of experience in equipment parts, service, and sales.

Products include discs, sprayers, dusters, vine trimmers, mowers, shredders, mulchers, spreaders, seeders, rockpickers, pallet forks, trenchers, post drivers, and many other specialty attachments.

For more information, contact:
Redwood Equipment, Inc.
4137 S. Moorland Ave., Santa Rosa, CA 95407
tel: 707/586-1790; fax: 707/586-1745
PLEASE SEE REDWOOD EQUIPMENT'S AD, PAGE 53.

DUARTE NURSERY, INC.

Choose Duarte Nursery's Big Pot Benchgraft for your vineyard; measure the quality by their performance. Duarte backs your Big Pot Benchgraft with a guaranteed stand and offers free delivery in most of California and Oregon.

Duarte offers one of California's best vineyard service teams. Markus Bokisch, Stefan Daniels, Dr. Miguel Duarte, Simon Graves, Joel Myers, and Steve Scheuber are available to provide sales and service throughout California and Oregon's grapegrowing regions. With the use of Big Pot Benchgrafts backed by consultation from Duarte's vineyard service team, you're guaranteed a successful planting.

DUARTE NURSERY INC.

Duarte defines quality as your complete satisfaction. Please call today.

For more information, contact:
Duarte Nursery, Inc.
1555 Baldwin Rd., Hughson, CA 95326
tel: 209/531-0351 or 800/GRAFTED
fax: 209/531-0352
PLEASE SEE DUARTE NURSERY'S AD, PAGE 88.

BIOLOGICALLY INTEGRATED ORGANICS®, INC.

Biologically Integrated Organics® Inc. (**bio**) is a leader in providing natural biological solutions for agriculture. **Bio** personnel understand the importance of healthy soil and believe that there is no chemical replacement for what a diverse population of microorganisms and their complex, biological processes impart to the soil.

Plant and microbial communities share a symbiotic relationship, exchanging the benefits of proteins, nitrogen, and oxygen. The majority of microbes in the soil are beneficial to plant health, and maintaining a proper balance in microbial diversity and numbers can promote aerobic activity in the soil. This both aids in the assimilation of nutrients and drives the development of a vigorous root system.

bio
Biologically Integrated Organics® Inc.

Two **bio** products, CERES® and LiquiComp®, work together through biological processes to augment and stimulate the soil's microbial community. Each is loaded with microbes selected to create diverse, stable microbial populations.

In winegrape trials, applications of CERES and LiquiComp showed increased pruning and cluster weights against the control block and helped vines recover from harvest stress. Together, these products offer microbial diversity and strength. Ultimately, they lead to healthier, more productive vines.

For more information, contact:
Biologically Integrated Organics Inc.
1720 Moon Mountain Dr.
Sonoma, CA 95476
tel: 707/939-8090; fax: 707/939-8092
e-mail: sales@bio-inc.com
website: www.bio-inc.com

CLIP-IT® SYSTEM

Save money, time, and labor with one of the fastest, easiest, and most cost-effective fastening systems in the world — *The Clip-it® System.* In seconds, attach irrigation drip tube, train grapevines and hold together catch wires or bird netting with the family of Clip-it® fasteners.

In the last two years, customers nationwide reported reductions of up to 50% of labor costs and time with the Clip-it® System. Available in multiple sizes and styles and made of durable, UV-resistant plastic, the Clip-it® System requires no retraining to use. Clip-its® hold vines, irrigation tube, and catch wires safely through strong winds and adverse weather conditions. Gentle on young vines, they are easily pruned off but hold fast during mechanical harvesting of grapes.

Use The Clip-it® System and put an end to the back breaking and time consuming labor associated with hanging irrigation tube, tying raisin and table grapes with twist ties or rope, or using green tape to train young vines.

New for this season is a dealer in your area! Call Clip-it® Systems or see the website for details. Free samples are available.

For more information or a product list, contact:
Clip-it™ Systems
4930C Eisenhower Ave., Alexandria, VA 22304
tel: 888/925-4748, 703/751-7146
fax: 703/751-7179
e-mail: info@clipitsystems.com
website: www.clipitsystems.com

VESTRA RESOURCES, INC.

VESTRA Resources, Inc., integrates information in a Geographic Information System (GIS) to improve information management for complex or large vineyards.

VESTRA builds maps of vineyards using aerial photography with land survey control and integrates information, so the virtual vineyard is available at your computer. Information sources include aerial or satellite imagery, GPS (global positioning systems), CAD (computer assisted drafting) files, data collection devices, and data recorded about blocks or vines.

VESTRA sells ESRI (Environmental Science Research Institute) products, featuring Arc Views Desktop GIS software. VESTRA offers training for Arc Views at its learning center or your location. On-site support is available for successful implementation of your GIS program.

Featured products and services available through VESTRA include: two-meter multispectral aerial imagery, with NDVI analysis, in print and digital form; VESTRA Site Analysis Map package, maps of percent slope, aspect, contour and American Viticultural Areas for your land acquisition/development needs; and VESTRA Ag Plan Services for automated vineyard design, delivering development maps and statistics on number of plants and rows, including row orientation. VESTRA also provides on-site support to aid your fast start to valuable data mining.

In addition to its American Viticultural Areas map products and custom maps (see www.vestra.com), VESTRA now offers a new ArcView Internet Map Server to share information within your company or with consumers.

VESTRA brings the best of the information technology world to the wine industry and will teach you how to use information to benefit your business.

For more information, contact:
VESTRA Resources, Inc.
962 Maraglia St., Redding, CA 96002
tel: 530/223-2585; fax: 530/223-1145
e-mail: info@vestra.com
website: www.vestra.com

PLEASE SEE VESTRA RESOURCES' AD, PAGE 38.

CHRIS GROW ENGINEERING

Chris Grow Engineering (CGE) is an Australian manufacturer of one of the highest quality lines of rotary mowers in Australia and has shipped it to California since 1996.

CGE offers a range of cutting widths to suit U.S. plantings in twin- and single-rotor configurations. The twins are truly versatile; front or rear mount (push/pull), to fit an ASV mounting, it can either throw minimal mulched cover crop up on the berm or, with dual blade and side anvils, pulverize prunings, and discharge prunings to the inter row.

Vineyard managers report high ground speed, low horsepower and lower fuel requirements, mower adaptability, and low maintenance with a rugged construction and ergonomic design for close plantings.

A new model has been developed recently to suit the narrow plantings and tight headlands of premium wine regions. A high-tub single-rotary with dual blades and double-sided anvils shreds vine cuttings as well as flail shredders do. The added benefit is high ground speed grass cutting, minimal input power, less dust, and only four blades to wear down.

Chris Grow mowers are backed by a California dealer network.

For more information, contact:

Acampo Machine Works
601 N. Sacramento St., Lodi, CA 95240
tel: 800/376-6638; fax: 209/334-6683

Rainbow Agricultural Services
235 E. Perkins St., Ukiah, CA 95482
tel: 800/427-2404; fax: 707/462-3627
810 Foothill Blvd., Calistoga, CA 94515
tel: 800/942-4566; fax: 707/942-9668
1975 Argonaut Rd., Lakeport, CA 95453
tel: 707/279-0550; fax: 707/279-0594
email: sales@rainbowag.com

Cal-Coast Machinery
3920 Ramada Dr., Paso Robles, CA 93446
tel: 805/434-5566
617 S. Blosser Rd., Santa Maria, CA 93458
tel: 805/925-0931

PLEASE SEE CHRIS GROW ENGR.'S AD, PAGE 87.

SUNRIDGE NURSERIES, INC.

More and more California winemakers and growers are enthusiastically planting ENTAV-INRA® French clonal grapevine selections available through Sunridge Nurseries in Bakersfield, CA.

Access to authentic French clones assures growers of buying grape nursery stock from one of the highest viticulture authorities in France, backed by years of intensive research.

As the demand for premium wines increases, winemakers are searching for versatility. Through Sunridge's extensive ENTAV clonal selections, winemakers can add diversity and quality in the tradition of French winemakers. This allows California growers and winemakers to purchase French clonal selections to fit their specific niche.

ENTAV is the center for research and production of certified grape clones in France. The organization makes genetic clonal selections of vines, which are introduced for official certification. The center's main mission is to supervise and coordinate genetic and sanitary selection work on traditional grape varieties and to guarantee the preservation of the selected vines and their natural genetic diversity.

A wide selection of these trademark clones are now established in mother blocks at Sunridge and guaranteed for authenticity and absence of disease. Sunridge continues to bring more clones from the ENTAV repositories and more releases are due in 2002 including: Cabernet Franc 214 and 327; Chardonnay 131; Merlot 182 and 348; and Carignan 6.

For more information, contact:

Sunridge Nurseries, Inc.
441 Vineland Rd., Bakersfield, CA 93307
tel: 661/363-8463; fax: 661/366-4251

PLEASE SEE SUNRIDGE NURSERIES' AD, PAGE 50.

MONARCH MANUFACTURING, INC.

Celebrating 31 years in business, Monarch Manufacturing produces the Zipset Benchcraft Planting System and provides over 35 million benchcraft propagation containers (plant bands) annually to the viticulture nursery industry.

Plant bands, individual biodegradable propagation containers, are designed to be transplanted directly into the vineyard, assuring a minimum amount of root ball damage. Alternately, the container can be easily removed at transplant if desired. The square design directs the root system downward within the container, eliminating the possibility of the plant becoming root bound, and allows for more plants per square foot in the greenhouse.

Economical plant bands are used once, eliminating any possibility of disease transfer. The potential to transfer unwanted pathogens to newly benchcrafted vines increases when a nursery reuses plastic containers year after year.

Monarch offers three sizes of Zipset collapsible propagation trays made of a tough UV-resistant polypropylene. Monarch's Zipset foil-laminated protective vine wraps are available in two styles: drop on or staple on. Monarch custom-makes all orders to customer specifications.

For more information and a complete complimentary sample packet, contact:

Monarch Manufacturing, Inc.
13154 County Rd. 140, Salida, CO 81201
tel: 800/284-0390 or 719/539-3335
fax: 719/539-3900
website: www.monarchmfg.com
e-mail: monarch@monarchmfg.com

PLEASE SEE MONARCH MANUFACTURING'S AD, PAGE 58.

PACIFIC WESTERN CONTAINER

A vine with early growth enhancement and protection provided by Vine Protectors will always be ahead of a plant of the same age that has none.

Giving your young vines a strong start in the first growing season will enhance survival by protecting them from wind damage, animal destruction, and chemical sprays. In addition, Vine Protectors save water and labor costs. Less water is needed because moisture around the plant is retained. Plants can grow taller before tying is needed, reducing labor costs.

The difference between a Vine Protector and a grow tube is the material from which they are made. Vine Protectors are white milk carton-type material, poly-coated on two sides. They will last approximately 12 to 18 months depending on field and weather conditions.

Traditionally, milk cartons have been used with some success. While the idea is good, the size is not. Vine Protectors are much taller, holes are provided for tying to cordon wire, and new this year, an area is provided for a bamboo stake. Field tested for five years, Vine Protectors typically outperform traditional milk cartons.

Pacific Western Container manufactures specialty agricultural products such as Vine Protectors, Tree Protectors, Plant Bands and a wide variety of corrugated containers for shipping, display and point-of-purchase. Since 1973, it has produced high quality products and offered exceptional service to customers.

Call to find a distributor near you.

For more information, contact:
Pacific Western Container
1535 E. Edinger, Santa Ana, CA 92705
tel: 800/241-3513, 714/547-9266
fax: 714/953-9270
website: www.pacificwestern.com

PLEASE SEE PACIFIC WESTERN CONTAINER'S AD, PAGE 11.

HERRICK GRAPEVINES

Herrick Grapevines produces high-quality plants that will assure your vineyard's success, offering your choice of 2.5-inch by 10-inch jumbo tubes or 3.5-inch by 5-inch jumbo pots. This large root system, combined with hardening the plants off in the full sun to minimize transplant shock, start your vineyard off with a bang.

HERRICK GRAPEVINE

Herrick Grapevines is a licensed producer of ENTAV/INRA® French clones. This gives you an opportunity to obtain authentic French clones from mother blocks supplied directly from France that are guaranteed to be true to variety. Herrick also offers dozens of selections of certified FPMS material, field selections, and rootstock choices. These are available as greengrowing benchgrafts, dormant benchgrafts, and dormant rootings.

Personalized, knowledgeable, and friendly service in both the office and the field combine to make Herrick Grapevines your best choice for grapevine plants. You are welcome to visit Herrick's operation in St. Helena and see for yourself the quality plant material produced.

Herrick Grapevines believes in your future success; let them help you get there.

For more information, contact:
Herrick Grapevines
1450 So. Whitehall Ln., St. Helena, CA 94574
Bob Herrick or **Nancy Abreu**
tel: 707/967-8000; fax: 707/963-7930
John Borelli
tel: 707/259-5228

TERRA SPĀSE, INC.

Terra Spāse, Inc., a leading provider of information and technology to the winegrape industry, now offers weather and disease risk maps, individual weather station data, and weather and disease forecasts for Napa and Sonoma counties online at www.Terraspase.com. USDA soil and USGS elevation data are also currently available for Napa County online.

Terra Spāse is the exclusive online provider of Fox Weather, LLC, weather products for the North Coast including: Satellite Rain Analysis, 10-day agricultural forecasts, a 30-day weather outlook, disease weather forecasts for botrytis and powdery mildew, and detailed, quantitative, satellite precipitation forecasts.

Terra Spāse also offers the latest technologies for the study of vineyard soils, weather, vine growth, and fruit production.

In 1999, Terra Spāse introduced Harvester Forecaster™, the first service for forecasting harvest dates and yields in specific vineyards. The program has been successful in forecasting October harvest dates for Cabernet Sauvignon vineyards as early as July 1.

The Terra Spāse Terroir Analysis program utilizes GIS and GPS for mapping soils, analyzing soil vigor potential, and recommending scion and rootstock combinations for vineyards in the North, Central, and South coasts.

Terra Spāse VINimage™ imagery is based on acrial multispectral data obtained with the ADAR 5500 platform. Terra Spāse has imagery for Napa, Sonoma, and parts of Lake counties from 1995 through 2000. Terra Spāse's aerial imagery has been used in projects to map vine canopy densities for improving harvest sampling, vine canopy management, pruning decisions, nutrition and irrigation management, and general vineyard assessments.

For more information, contact:
Terra Spāse, Inc.
345 La Fata St., Suite D
St. Helena, CA 94574
tel: 707/967-8323; fax: 707/967-8596
e-mail: terraspase@earthlink.net

A&P AG STRUCTURES, INC.

A&P Ag Structures, Inc., designs, sells, and installs new, innovative agricultural trellis designs for the viticultural industry.

A&P's design department is devoted to making grapegrowing easier and more productive. The RAIL NOTCH stake is an example of A&P Ag being an innovator in the trellis industry. The RAIL NOTCH is a vertical stake made of rail steel metal, the strongest material on the market. Wire notches every four inches give the grower more flexibility and a greater width between catch wires than any other stake on the market.

Due to the extreme metal thickness, carbon, and magnesium found in rail steel there is a greater longevity than any other stake, even galvanized or epoxy coated stakes. If you're looking for a vineyard support that only lasts seven to 12 years and will handle minimal tonnage, call A&P competitors. If you're looking for a quality product that may last longer than you and can hold maximum tonnage, call A&P Ag Structures.

In addition to trellises, the company also sells improved vineyard products such as clips, bamboo, bird netting, posts, wire, the new triangular grow carton, the new MS2000 end post strainer, and many other everyday vineyard products. Materials in A&P products have been tested for strength and longevity.

A&P Ag Structures strives to design and sell only the best products and install with the best crews and equipment, serving clients who want quality and longevity. A&P Ag Structures, Inc., is *"Supporting the grape industry one vine at a time."*

For more information, contact:
A&P Ag Structures, Inc.
11266 Avenue 264, Visalia, CA 93277
tel: 559/685-8700; fax: 559/685-8622

PLEASE SEE A&P AG STRUCTURES' AD, PAGE 10.

PELLENC AMERICA, INC.

PELLENC America, Inc., a subsidiary of the French Pellenc S.A. factory, has moved to a new 11,000-sf facility on Hopper Avenue in Santa Rosa, CA. Pellenc offers a full line of Precision Viticulture™ machines, and grape harvesters with the Pellenc Smart System picking head.

There is a choice of stainless steel bins or side discharge conveyor and also a wheel-assist, tow-behind model. The Multifunction tractors are factory-designed to receive different specific implements such as pre-pruners, wire lifters, trimmers, two- or four-row sprayers, spreaders, and more. Any attachment can be put in or out by only one man in less than 20 minutes.

The unique Smart System allows adjustment of the frequency, pinch, amplitude, and acceleration from the comfort of the cab.

Parts and service are available from the new location.

For more information, contact:
PELLENC America, Inc.
1042 Hopper Ave., Santa Rosa, CA 95403
tel: 707/568-7286 or 888/PELLENC
fax: 707/568-7369
website: www.pellenc.com

GRIPPLE, INC.

Gripple® is a preferred method for joining trellis wire. The simplicity of Gripple's design allows you to splice, tension, and re-tension vineyard wire

in seconds. Simply pass your wire into the ends of the Gripple. Once the Gripple is in place, it automatically locks to secure the wire. Gripples are reusable and will not rust or corrode.

No tools are required to use the Gripple; however, the Gripple Tool is a specialized tensioning tool designed to work with Gripples. The Gripple Tool is advantageous where access is restricted or where frequent re-tensioning is required.

The Gripple product, Gripple Anchor-Fast, is a fast and easy way to secure end posts in vineyards and fruit-growing orchards. The Anchor-Fast system consists of a length of stainless steel wire rope with a ferruled loop at one end and a Gripple at the other. For more information about Gripple Anchor-Fast, please contact Gripple, Inc.

For more information, contact:
Gripple, Inc.
PO Box 368, Batavia, IL 60510-0368
tel: 800/654-0609; fax: 800/654-0689

CALIFORNIA GRAPEVINE NURSERY, INC.

California Grapevine Nursery, Inc., is a grapevine nursery certified by the state of California Department of Food & Agriculture, providing growers with the highest quality planting materials. Available products include dormant rootstock and dormant grafted vines at very competitive prices.

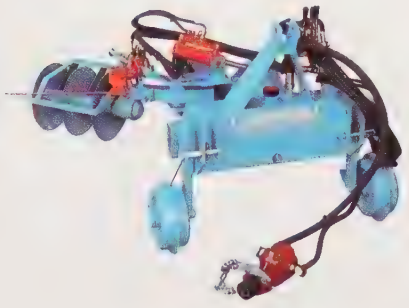
Choose from 21 varieties of certified rootstock including the French-developed Gravesac variety. California Grapevine nursery offers a large selection of scion varieties and clones including ENTAV-INRA® clones to customize your grafted vine order. The nursery is now taking rootstock orders for 2001 and future seasons and custom-grafted vine orders for the 2002 season.

Using state-of-the-art nursery practices, California Grapevine Nursery is not only dedicated to providing customers with the highest quality plants available, but also with excellent, efficient customer service.

For more information, contact:
California Grapevine Nursery, Inc.
1085 Galleron Rd., St. Helena, CA 94574
tel: 800/344-5688; fax: 707/963-1840
e-mail: sales@californiagrapevine.com
website: www.californiagrapevine.com

PLEASE SEE CALIFORNIA GRAPEVINE NURSERY'S AD, PAGE 20.

FERRARI TRACTOR CIE



A. Spedo led the way to intervine tillage in 1963 with a hydraulic berm disc. Twenty-five years of performance in the U.S. market have proven the reliability, sensitivity, and quality of the berm disc's tillage. It tills out weeds between vines in the row, with as little as three-foot spacing between vines.

A simple reliable, hydraulic sensor protects even very young plants. Whether you plant flat or on a berm, have valley adobe soils, delta peat soil, foothill red clays and gravels, San Joaquin Valley sands, or schist-based coast range clays, the A. Spedo berm disc out-performs all other systems. It can work one berm or both simultaneously.

Either way you will benefit from a very solid trouble-free machine that is entirely self-contained with its own PTO-driven pump and large hydraulic reservoir. This eliminates the need for regulators and the return pressure problems of vineyard hoes and gives you the flexibility to change the equipment easily from tractor to tractor. Lower-power tractors without large hydraulic systems can also be used effectively.

Recent improvements include hydraulic power-driven disc gangs and operator-override of the sensor that combines the ability to skip tillage around new replants with very aggressive weeding.

For more information, contact:
Ferrari Tractor CIE
PO Box 1045, Gridley, CA 95948
tel: 530/846-6401; fax: 530/846-0390
email: sales@kimcomfg.com
website: www.approtecag.com

VINIFERA NURSERY

From the smallest replant orders to orders for the largest new acreage, Vinifera has your vines. Vinifera offers growers premium quality, disease-tested wine and table grape plant material. To meet grower needs, Vinifera produces a choice of plant material:

Herbaceous grafts: With Vinifera's unique grafting method, greenhouse scion cuttings are grafted onto green rootstocks. Herbaceous grafting results in vigorous vines with well-healed graft unions and exceptionally well-developed root systems.

Traditional benchgrafts: A longtime industry standard.

Selection: Vinifera offers its customers more than 12 rootstocks and 100 scions to choose from, making it possible to fill orders from the most sought after scion/rootstock combinations to specialty, hard-to-find clones.

Availability: Bareroot and pot-dormant plants (both herbaceous grafts and benchgrafts) are available for delivery February through May. Green-growing vines are available for delivery starting in May.

Dedication to customer service: Vinifera has a company-wide commitment to customer service. From pre-plant considerations to follow-through in the field, the staff and management of Vinifera are dedicated to helping growers solve problems and achieve superior vineyard results.

For more information and a detailed product availability list, contact:
Vinifera Nursery
Jackie Hardman: Sales Manager
Kim Petersen: Sales Assistant
4288 Bodega Avenue, Petaluma, CA 94952
tel: 707/773-4557; fax: 707/773-0665
Oregon Office
Dave Nelson: Sales Manager
tel: 800/648-1681; fax: 503/244-5348
PLEASE SEE VINIFERA NURSERY'S AD, PAGE 10.

WEED BADGER DIVISION

Weed Badger introduces the 3875 Weed Badger Mower Attachment and the Badger Broom Assembly for seasonal clean-up and weed control. These tool packages are ideal for fall clean up, disease control, vertebrate control, dormant winter insect control, and removal of winter weeds. Fall weed control eases the pressure on weed control for the next season.

The new Model 3875 Weed Badger Mower Attachment is designed for rugged high speed mowing almost anywhere. It allows precision cutting; elimination of chemicals and hand labor; maintains berms, slopes, or perimeters; prepares the strip before harvest; mows in-row weeds; and cuts big weeds and grass without plugging.

The Weed Badger Broom Assembly sweeps away in-the-row trash problems. Gentle poly bristles clean out leaves and debris up to an 18-inch swath without disturbing the soil; sweep off vine rows after spring hill-down; and clean/sanitize in-row strips easily. The Broom Assembly helps growers prepare for harvest, perform post-harvest cleanup, and prevent diseases by removing fallen fruit. Bristle sections are quickly and easily replaced for fast maintenance.

These tool packages are designed for specific growers to do tasks that previously could only be accomplished through expensive hand labor or costly herbicide, pesticide, and rodenticide applications.

For more information, contact:
Weed Badger Division
Town & Country Research & Development, Inc.
5673 SE 95 Ave., Marion, ND 58466
tel: 800/437-3392, 701/778-7511
fax: 701/778-7501
e-mail: weedbadg@drtel.net
PLEASE SEE WEED BADGER'S AD, PAGE 47.

PATCHEN, INC.

Saving money on chemicals and labor is the main reason why leading growers use the WeedSeeker® Selective Spray System to control weeds in their

vineyards. It sprays only weeds, not bare ground or dirt, reducing chemical use up to 80%.

While most vineyard sprayers operate at five to six miles per hour, the WeedSeeker® sensors are designed to spray at speeds up to 10 mph. One operator with a WeedSeeker® Vineyard System moving twice as fast down the tractor row as a conventional two-man crew spot-spraying is incredibly more cost-effective and efficient.

The WeedSeeker® Vineyard system is easy to use and can be mounted on ATVs, tractors, and a variety of utility vehicles. The sensors are mounted under hoods on a spray boom to protect the vines from drift and can be used to spray berms and middles.

Patchen Inc. is an agricultural technology leader offering growers worldwide one of the most exciting solutions available to the age-old problem of weed control.

For more information, contact:
Patchen Inc.
1147 N. State St., Ukiah, CA 95482
tel: 888/PATCHEN (728-2436) or 707/467-3747; fax: 707/467-3750
e-mail: info@weedseeker.com
website: www.weedseeker.com

PLEASE SEE PATCHEN'S AD, PAGE 78.

GROWERS SUPPLY & IRRIGATION, INC.

Growers Supply and Irrigation, Inc. has been servicing the north end of Sonoma County from its Geyserville location for over 40 years. Third generation owners, Kevin and Susie Hare, are active in its day-to-day operations.

Kevin is a Certified Drip Irrigation Designer, certified by the International Irrigation Association. He has been involved in the design aspect of the business for 20 years. He takes a hands-on approach to every project. He is involved from the planning stage through the design stage, using state-of-the-art computer-aided design packages to ensure each system is tailored to the resources available. His past experience in installation helps in troubleshooting customer's needs.

Susie handles the retail end of the business, which is also an Ace Hardware store. Product lines are geared to ranch and farming supplies, but many homeowner products are also available.

Growers Supply prides itself in carrying the best products available by distributing PW Pipe, Netafim Irrigation, Hardie/Toro Irrigation, Rainbird and Nelson Sprinklers, Advanced Drainage Systems, Agricultural Products, and more. Come by and see what is available.

For more information, contact:
Growers Supply & Irrigation, Inc.
Kevin and Susie Hare
20750 Geyserville Ave.
PO Box 258, Geyserville, CA 95441
tel: 707/857-3484; fax: 707/857-3132

PLEASE SEE GROWERS SUPPLY & IRRIGATION'S AD, PAGE 9.

KIMCO MANUFACTURING, INC.

The Kimco Model M-9700 mows weeds in the vine row and around vines, cutting a 22-inch wide swath with each pass. For those wishing to reduce or eliminate the use of herbicides, the mower offers a tool to control weeds, in addition to cultivation.

The Kimco mower is designed to operate under suspended drip lines and around small steel training stakes. It will operate in both young plantings and in mature vines, cutting weeds within one inch of the stake or vine.

The Kimco mower automatically rolls around the vine but the operator can also retract the mower out of the vine row or adjust the cutting height through a 10-inch range.

The Kimco mower is a complement to the Kimco in-row-tiller: using quick disconnect hydraulics, common mounts, and power paks being easily interchangeable. It is available in single side or double (right and left) side,

front or mid-mount.

For more information, contact:
Kimco Mfg., Inc.
9200 W. Barstow Ave., Fresno, CA 93722
tel: 800/356-9641
e-mail: sales@kimcomfg.com
website: www.kimcomfg.com

PLEASE SEE KIMCO MFG.'S AD, PAGE 86.

GALO MACLEAN NURSERY

Galo MacLean Nursery offers more than 26 years of nursery experience and provides technical advice on rootstock selection based on site. The nursery specializes in first quality, certified, dormant rootings of rootstocks and dormant benchgrafts.

Rootstock varieties include: 110R, 1103P, Teleki 5C, Kober 5BB, 101-14MG, 3309C, S04, and 140R.

Benchgrafts are made under contract to customer specifications.

Galo MacLean offers crucial expertise, based on backgrounds including degrees in enology, viticulture, agrichemistry, and soil microbiology.

For more information, contact:
Galo MacLean Nursery, Inc.
2160 Cuttings Wharf Rd., Napa, CA 94559
tel: 707/255-8874; fax: 707/255-4579

PLEASE SEE GALO MACLEAN NURSERY'S AD, PAGE 83.

SUTTON AG ENTERPRISES, INC.

Birds cause extensive damage every year. This depredation may range from crop losses to health and safety hazards, but is especially prevalent in ripening grapes. By using a combination of Sutton Ag's bird control products, it is possible to minimize or completely control these losses in your vineyard.

The key to any pest control program is variety; employing different methods, alternating the duration or time of day used, relocating the devices, and so on. Sutton Ag's bird control products can significantly reduce damage caused by pest birds and protect your vineyard investment.

Sutton Ag Enterprises

Sutton Ag is the exclusive U.S. distributor of Bird Bombs® and Bird Whistlers®, Guardian Scarecrow Cannons, and Easy Net™ lightweight netting. Sutton Ag has a wide variety of sonic, visual, and exclusionary products, including: Bird Gard distress cries, Bird Baffler™ reflective tape, Bird Baffler™ Revolution, premium and disposable grade netting, bird repellent gel, and more.

For your seasonal problems, Sutton Ag offers a rental program for propane cannons and the Bird Gard Super Pro. Many of the products listed here are available through Sutton Ag's network of bird control dealers.

For more information, contact:
Sutton Ag Enterprises, Inc.
Diane deLorimier
746 Vertin Avenue, Salinas, CA 93901
tel: 831/422-9693 or 800/482-4240
fax: 831/422-4201
e-mail: suttonag@earthlink.net

PLEASE SEE SUTTON AG ENTERPRISES' AD, PAGE 84.

AMERICAN TRELLISING, INC.

Specializing in vertical trellis systems, American Trellising (ATI) is the company to call for your Spring 2001 planting projects. ATI has taken advantage of the lull in planting during harvest to stock up on large quantities of all major product lines, including the bent edge vertical line post and the V3 End Post. Most standard products are available for immediate shipments daily, eliminating long waits for manufacturing.

The ATI sales team is comprised of industry veterans whose knowledge and experience can help you make educated decisions about what kind of trellis will work best with your particular vines and conditions. They can also be instrumental in assisting with retrofit and replacement projects. Quotes are returned in an accurate and timely manner, with competitive pricing and detailed product descriptions. ATI also provides meticulous customer service, which makes shopping for trellising at ATI easy and convenient.

All products are manufactured with prime industry steel for a quality, dependable product that you can count on every time. Installers rave about the V3 End Post as being quick and easy to drive. Experience for yourself the American Trellising difference. With distributors in Washington, Oregon, Idaho, and North Carolina, as well as several locations in California, ATI is ready to serve you, wherever you might be.

For more information, contact:
American Trellising, Inc.
1060 A Kaiser Rd., Napa, CA 94558
tel: 707/259-5222; fax: 707/259-5220
e-mail: trellisales@americantrellising.com

PLEASE SEE AMERICAN TRELLISING'S AD, PAGE 53.

CALDWELL NURSERY, INC.

Caldwell Nursery, Inc., situated in the heart of Napa Valley, has become known for its expertise in French clones. The nursery focuses on French ENTAV-INRA® clones and rootstocks and offers both green-growing and dormant benchgrafts. For field-budding needs, both spring and fall budwood is available.

John Caldwell has released his second edition of the "Concise Guide to Wine Grape Clones for Professionals." It provides information on wine trials with respect to soil, climate, and rootstock choices on French, Italian, and American clones.

The book is based on 15 years of research, beginning with Caldwell's first trip to Bordeaux, where he was introduced to a clonal program. The book came about because Caldwell wanted to provide an intellectual base for making clonal decisions. "We need to know why we use clones," says Caldwell.

Caldwell also provides consulting on vineyard planning and clonal decisions.

For more information, contact:
Caldwell Nursery
169 Kreuzer Ln., Napa, CA 94559
tel: 707/255-1294; fax: 707/255-5162

PLEASE SEE CALDWELL NURSERY'S AD, PAGE 6.

WESTERN SQUARE INDUSTRIES

Western Square Industries (WSI) manufactures two-ton harvest bins for the "valley system" and also makes a variety of field trailers for use with valley bins and half-ton and quarter-ton plastic bins.

Western Square is best known as a vineyard supplier for its narrow-row trailers. WSI is the only manufacturer of narrow-row trailers that can take four-foot wide bins down a six-foot wide row. Models that fall into this category are the blue trailer, which holds either one valley bin or two 4-foot by 4-foot plastic bins, and the gray trailer, which accommodates three 4-foot by 4-foot plastic bins. Both models feature plastic slides and ramps that allow the bins to slide smoothly off the rear of the trailer using the three-point hitch on a tractor.

Western Square also makes a green trailer for use in conventional rows (over eight-feet wide) that accommodate either a valley bin or two 4-foot by 4-foot plastic bins. This trailer also has plastic slides for easy off-loading to the ground. For valley bin users, this trailer makes it unnecessary to have a forklift at the roadhead until a flatbed truck arrives to take away the whole truckload.

Finally, Western Square makes two trailers that *do* require a forklift for unloading: the narrow-row bronze trailer and the conventional-row black trailer. Both models handle one valley bin or two 4-foot by 4-foot plastic bins.

For more information, contact:
Western Square Industries
1621 Broadway, Stockton, CA 95205
tel: 209/944-0921 or
inside CA: 800/367-8383
outside CA: 800/367-7810
fax: 209/944-0934

PLEASE SEE WESTERN SQUARE INDUSTRIES' ADS, PAGES 76 & 83.

TAYLORED PRODUCTS COMPANY

Looking for a better way to hang drip hose? Taylored Products is introducing nine new drip hose hanging devices for 16mm, 18mm, and 20mm hose for the vineyard.

Made of long life plastic, the hanger snaps onto 12-, 13-, or 14-gauge hose wire at any place along the hose. The top "hook" of the hanger will lock on the wire to prevent it from slipping while the saddle allows the hose to move with heat expansion and contraction.

Additional features include:

1. A wide saddle to keep the hose from kinking;
2. A firm grip on the hose to keep it from sliding;
3. Knurls to resist hose twisting;
4. A tapered opening to allow easy hose installation;
5. A stiff rib to keep the hose clamp from relaxing;
6. A sharp edge to break the surface tension of the water to keep it from running down the hose;
7. A hose hanger that is fast and easy to install;
8. A hose hanger that will last as long as the hose.

The ***Constant***™ hanger is fast and easy to use. Designed for fast installation by placing a finger in the hose saddle and snapping on the wire, the hose is then inserted with a slight 1/4 turn.

Constant™ hangers are by the makers of "Original" AG-TYE™, has a patent pending, and is a trademark of the Taylored Products Company. ***Constant***™ hangers are packaged in 5,000 count cartons and available from your vineyard supply or irrigation center.

For more information, contact:
Taylored Products Company
tel: 714/292-2803; fax: 714/842-0791
PLEASE SEE TAYLORED PRODUCTS AD, PAGE 55.

EURO-MACHINES, INC.

Euro-Machines has expanded its line of New Holland BRAUD Grape Harvesters and its west coast dealer network. Joining the Euro-Machines network in California is Kuckenbecker Tractor Company (tel: 559/674-2496 or 559/485-9090.) Two more dealers are Coastal Tractor Company (tel: 831/757-4106, 831/385-5401, 408/842-0317, 805/239-5772), and Lampson Tractor Company (tel: 707/967-3550, 707/857-3443, 707/463-1210.)

The new New Holland BRAUD grape harvester addition is model SB65. The SB65 is a self-propelled, 4x4 hydrostatic drive machine with a left hand grape collecting tank and right hand conveyor discharge boom. It is capable of picking up to 36-inch cross-arm trellising and 15 tons per acre at full harvesting speed in terrain with up to 30% side slope and 40% incline. In addition, this machine will maintain its multi-purpose capability like all other New Holland BRAUD self-propelled harvesters.

The correct New Holland BRAUD grape harvester is waiting and ready for you. Euro-Machines wants to earn your business and will beat the competition in price and value, while striving to exceed your expectations for service. A pre-harvest service and operation seminar, very hands-on for mechanics and drivers, is held annually free of charge. Ask Euro-Machines for a reference list to let its customers attest to who is the best grape harvester company in the industry.

Euro-Machines has moved its headquarters to a new, larger location in Suisun City, CA. 24-hour service and parts delivery are available from the warehouse to support customers and dealers.

For more information, contact:
Euro-Machines, Inc.
West: 4950 Fulton Dr., # E
Suisun City, CA 94585
tel: 707/864-5800; fax: 707/864-5879
East: PO Box 843, Culpeper, VA 22701
tel: 540/825-5700; fax: 540/825-5789
PLEASE SEE EURO-MACHINES' AD, PAGE 35.

KINSEY'S AGRICULTURAL SERVICES

Kinsey's Agricultural Services specializes in soil fertility management. Detailed soil audits determine specific fertilization programs based on individual vineyard needs.

Kinsey's has received soil samples for analysis and fertility recommendations from some 200 winegrape growers, predominantly from vineyards on the west coast of the U.S. The company also works with several clients from Australia and other winegrowing areas of the world.

Kinsey's does not sell fertilizers, only a service which determines needed fertility changes. The grower will generally acquire what is required from local dealerships.

You cannot correctly manage needed nutrients until you have the ability to correctly measure them. The Albrecht system of soil analysis, which is the only one Kinsey's uses, is based on more than 50 years of soil fertility work using detailed measurements and specifically formulated procedures for controlling both excesses and deficiencies in soils. It is possible to define, measure, and manage soil fertility in order to achieve higher quality in the vineyard.

Kinsey's provides soil fertility training programs for interested clients. Though not necessary for using the actual fertilization recommendations, the training is designed to help clients better understand the reasons for specific nutrients based on the needs of each particular area as shown by testing.

Kinsey's strives to teach how high quality wines do not necessarily result from stressing the vines by depriving the soil of its natural fertility requirements. The company specializes in building top fertility into vineyard soils, ultimately producing the utmost in grape quality without compromising production levels.

For more information, contact:
Kinsey's Agricultural Services
Neal W. Kinsey
297 County Highway 357
Charleston, MO 63834
tel: 573/683-3880; fax: 573/683-6227
website: www.kinseyag.com
PLEASE SEE KINSEY'S AGRICULTURAL SERVICES' AD, PAGE 60.

VINTAGE NURSERIES

Vintage Nurseries is a California certified nursery that produces grapevines for the wine, table, and raisin industries. Established in 1989 by brothers Jeff and Greg Sanders, Vintage Nurseries has become one of the largest producers of dormant field-grown bench-graft grapevines in North America.

Vintage Nurseries specializes in the production of certified dormant bench-grafts, greenhouse-grown potted bench-grafts, dormant rootstock rootings, and other related products. Vintage Nurseries is currently shipping to grapegrowers worldwide.

Vintage Nurseries is committed to providing its customers with the best quality grapevines and customer service the industry has to offer, along with the industry's most competitive pricing. Please feel free to request a list of satisfied customers who will confirm that Vintage Nurseries is..."*a cut above.*"

For more information, contact:
Vintage Nurseries
Melinda Richardson
27920 McCombs Ave., Wasco, CA 93280
tel: 800/499-9019; fax: 661/758-4999
Northern California: Steve Huffman
tel: 209/523-8036
Central Coast: Dave Haggmark
tel: 805/237-8914

PLEASE SEE VINTAGE NURSERIES' AD, PAGE 41.

SPEC TRELLISING

Spec Trellising specializes in vineyard trellis and related products. Spec provides high quality products at the most competitive prices, along with the highest level of service. Customer satisfaction is Spec's top priority, and its ever-expanding product line includes just about everything the grapegrower will need to trellis and train vines.

In addition to galvanized and aluminum-clad wire, Spec offers Zalcote wire, the most advanced vineyard wire available. This exciting wire provides at least twice the corrosion resistance of class-3 galvanized wire, along with "galvanic healing" properties not found in aluminum-clad wire.

Spec's metal vineyard stakes and post extenders make trellis installation and canopy management a breeze. With the stake's built-in wire tags to contain wires, staples and wire clips are no longer needed.

Spec is the exclusive distributor of the Wire Anchor. A retensionable, releaseable, wire anchor used to attach trellis wires to end posts, the Wire Anchor is a one-size-fits-all anchor. It is not necessary to use different size parts for different size wires, nor is it necessary to use a tool to release wire from the end post.

To secure movable wires to timber posts, Spec offers the Prudent wire clip. Held to the post by a staple, the Prudent clip has hooks on both top and bottom, which enable wires to be held securely, in the most demanding of vineyards.

In addition, Spec offers vine tying and taping products, bamboo stakes, galvanized pencil rod, earth anchors, wire connecting hardware and more.

For more information, contact:
Spec Trellising
39 Indian Dr., Ivyland, PA 18974
tel: 800/237-4594 or 215/322-5588
fax: 215/357-3122
e-mail: info@spectrellising.com
website: www.spectrellising.com

PLEASE SEE SPEC TRELLISING'S AD, PAGE 55.

FOX WEATHER, LLC

Fox Weather, LLC, has teamed with Terra Spāse, Inc., of St. Helena, CA, to provide additional weather forecast products to the viticultural community in Napa and Sonoma counties.

In addition to the Satellite Rain Analysis and the 10-day agricultural weather forecast for the Napa Valley and Sonoma County, Fox Weather also provides the following products through Terra Spāse: 30-day outlook (text) updated weekly, disease weather forecasts for botrytis and powdery mildew, detailed quantitative precipitation forecasts at three-hour time resolution for Napa and Sonoma counties, and graphical moisture analyses from the SSM/I microwave satellites.

Fox Weather has been using microwave satellite data from SSM/I for predicting rainfall in California since 1991 and has found it to be the tool of choice for preparing quantitative precipitation forecasts (QPF). QPFs are important to vineyard managers, not only for planning harvest operations but also for vineyard management and erosion control during winter and spring.

Fox Weather also provides frost forecasts for grapegrowers in Napa Valley and Sonoma county, during the spring frost season, and for Mendocino County during the fall and spring frost seasons.

If you live in Napa or Sonoma County and wish to subscribe to Fox Weather's products on the internet, including the new services, please contact Terra Spāse at 707/967-8325. If you are outside these areas please contact Fox Weather at 805/985-8743.

For more information, contact:
Fox Weather, LLC
3924 W. Channel Islands Blvd.
Oxnard, CA 93035
tel: 805/985-8743; fax: 805/985-3706
e-mail: foxweather@worldnet.att.net
Terra Spāse
345 La Fata St., Suite D
St. Helena, CA 94574
tel: 707/967-8323; fax: 707/967-8596
e-mail: terraspase@earthlink.net

PLEASE SEE FOX WEATHER'S AD, PAGE 51.

MILLCREEK MANUFACTURING

Millcreek Manufacturing has introduced a new high-capacity version of its row mulcher for applying compost and mulch in rows. The Model 2000 Row Mulcher has a 20-cubic-yard capacity, and can mulch rows up to half a mile long with one load. Row mulchers are widely used on a variety of crops, including grapes and citrus, as shown in the photo.

The Model 2000 Row Mulcher typically saves two-thirds of the time and labor for mulch application compared to conventional methods. It applies 20 cubic yards of mulch in rows in approximately 15 to 20 minutes, depending on machine settings and allows a single operator to apply mulch to an acre in about two hours, depending on row spacing. Mulch beds can be adjusted from 12- to 84-inches wide, from ½- to 12-inches deep.

Six smaller sizes, from 3.4- to 13-cubic yard capacities, are available. Prices start under $6,000. Millcreek also produces custom row mulchers.

For more information, contact:
Millcreek Manufacturing
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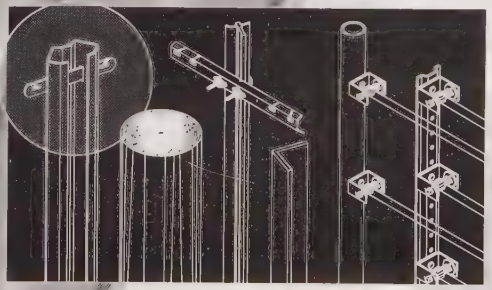

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fax: 541/942-9867
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CAL-PAC

Growers looking for a full-service supplier know to rely on CAL-PAC for a wide range of high-tech vineyard trellising products customized to meet the specific needs of each project.

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EQUIPMENT THAT WORKS

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Vineyard Augers are in use from Oregon to Georgia, California to New York. They can be operated from almost any tractor with necessary hydraulic flow. One is mounted on a crawler tractor in the center of the blade mount on a pivot so that the unit can work on either side of the tractor.

The standard package includes a nine-inch diameter 12-inch long auger mounted on a boom that will stow within the track of the tractor. The package also includes a three-section control valve that mounts on the floor boards of your tractor or on a platform extension if the tractor is too narrow for both operator and valve control. Up to 250 holes per hour have been reported. Literature available upon request.

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Equipment That Works
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Did you know that Jim's Supply Co., Inc., is a one-stop location for all your vineyard trellising supplies? Jim's Supply is a manufacturer of metal stakes, posts, crossarms and braces. Buy direct and save! Wire, clips and ties, wire tightening devices and tools, and grow tubes are also available — everything you'll need for your trellis system.

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Jim's Supply has been in business since 1959 but that doesn't mean the company doesn't change with the times. The most recent innovation has been the Super Stake Grande, now one of Jim Supply's most popular vertical trellising stakes. Salesrooms are in Calistoga and Bakersfield, CA, where you're sure to find what you need in an over 10-acre facility.

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PLEASE SEE THE JIM'S SUPPLY AD, PAGE 84.

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For more information, contact:
Toyota Material Handling
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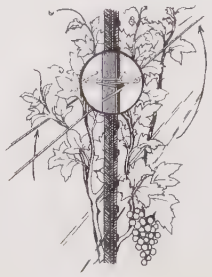
PLEASE SEE THE TOYOTA MATERIAL HANDLING AD, PAGE 42.

VINEYARD INDUSTRY PRODUCTS

Vineyard Industry Products Co. has supplied trellis systems and supplies to California grapegrowers for two generations, as one of the largest stocking dealers in the industry.

Inventory consists of Class-1 galvanized high-tensile wire and T-posts made in the U.S. from Georgia Pacific; rolled-edge highway posts with bytes and crossarms made by North Star Co. in California; drill-stem pipe end-posts, pressure-treated lodgepoles, rebar and pencil rod training stakes; all models of grape stake wire clips; Gripple brand wire connectors and tighteners; double-welded, screw-in earth anchors; deer

J-R~clip



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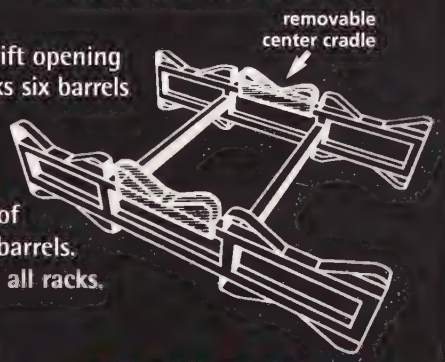

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Kendall-Jackson Wine Estates raised the bar of nursery quality in 1999 when it opened its in-house nursery to customers throughout the industry.

Kendall-Jackson grafted close to five million vines in 2000 on its ranch north of Madera to serve its own needs and those of a growing fine-wine industry. "The Madera nursery has become one of the nation's largest grapevine sources in the short time since it opened in 1993," says Ernie Bowman, nursery director.

"We do things our own way from start to finish because we are so focused on, maybe even a little obsessed with, quality," he says. "And our quality is second to none in the industry."

The nursery is notable for its use of prized scionwood cuttings from some of California's choicest vineyards, including those on Mt. Veeder in Napa County and Alexander Mountain Estate in Sonoma County.

One key to quality at the nursery is trellising. Trellising, the exception rather than the rule at most nurseries, gets the rootstock off the ground for ideal sun exposure; it reduces pests and fungus pressures and encourages straight cuttings for grafting.

Vines, many growing in old rabbit hutches-turned greenhouses, are custom-cultivated on the ranch to meet various requirements in terms of disease resistance, vigor, and drought tolerance.

The product line includes dormant benchgrafts, dormant rootings, green benchgrafts, and green quick-starts. The nursery offers custom orders and free delivery for orders of more than 10,000 plants.

Additional information about the nursery and its products is available at the Kendall-Jackson website.

For more information, contact:
Kendall-Jackson Nursery
Ernie Bowman, General Manager
425 Aviation Blvd., Santa Rosa, CA 95404
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PLEASE SEE THE KENDALL-JACKSON NURSERY'S AD, PAGE 27.

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Cal Poly is strongly committed to achieving excellence through cultural diversity. The university actively encourages applications and nominations of women, persons of color, applicants with disabilities, and members of other underrepresented groups. AA/EEO

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264pp—$29.95

Fifty years of research
Continued from page 15

Genetic relationships observed in our analysis agree with the current taxonomy and indicate *Vitis vinifera* is genetically distinct from both the North American and Asian grape species. In addition, we identified three major groups of *Vitis* species that will be useful in further investigations.

A professional flavorist, Leslie Norris, was added in 1998 to not only work with the product development department, but also with the chemistry group to determine if various compounds they identified as having sensory impact really were responsible for important tastes and aromas. Her understanding of how flavor compounds interact and alter their sensory properties with changes in concentration have been invaluable in this area of research.

The sensory department headed by Dr. Isabelle Lesschaeve ties all these efforts together. Ten tasting booths are equipped with computers that are, in turn, linked to a central server utilizing specialized sensory software. Additional statistical software permits the construction of preference maps, PCA plots, spider web diagrams, and numerous other representations of statistically-analyzed sensory results. The group can provide difference testing, preference evaluations, coordination with marketing consumer testing, and other services.

Research winery

Gallo's small-scale research winery, which has existed in various forms since the 1950s, was completely refurbished in 1998. It was equipped with small stainless steel tanks, many of which are jacketed and can be accurately temperature-controlled by circulation of chilled glycol. A computer controls and monitors the status of these tanks.

Small-scale bladder presses operate under microprocessor control and can simulate the effects of full-size devices. More than 500 experimental fermentations have been conducted in the research winery in a single year. The wines produced in this facility permit us to evaluate various viticultural and winemaking possibilities. An adjacent pilot plant provides the necessary environment and equipment for the process development group to explore new technologies or transfer techniques that have been effective in other industries and adapt them to Gallo's needs.

The research effort that began with a handful of people performing experiments when time permitted has grown to a staff of over 60 people, including postdoctoral appointees, interns, and trainees. Virtually all major scientific disciplines are encompassed within Gallo's research and technical services department.

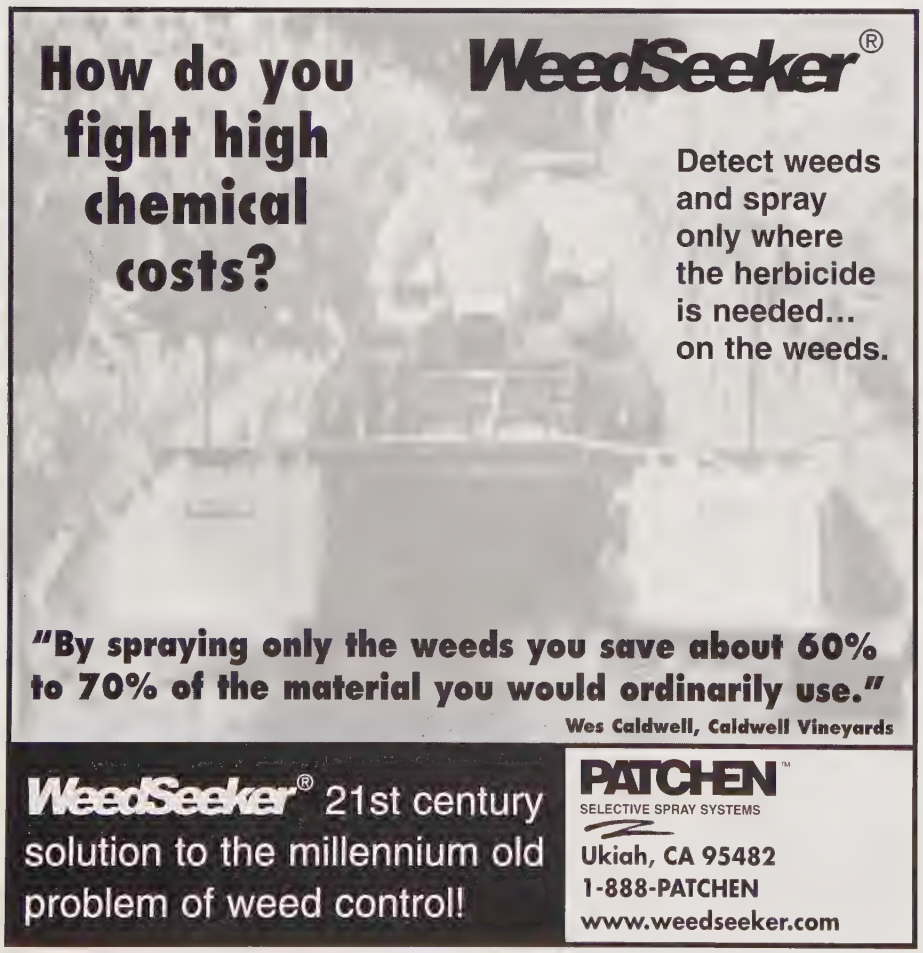
Scientists have been recruited from all over the world to assist in this effort, now directed by Dr. Terry Lee, who joined the organization after a distinguished career heading the Australian Wine Research Institute. All parts appear to be in place to move the research effort at the E&J Gallo Winery to the next level of excellence and to help fulfill the vision of the company's founders.

As I prepared this presentation, so many names from years of research efforts at Gallo came flooding back to me — Emil Mrak, Maynard Joslyn, Rose Marie Pangborn, Walt Jennings, Elie Skofis, and dozens of others.

Some people I have mentioned may not be familiar to the younger enologists and viticulturists or may just be names they have seen in old publications. Many have retired; many more are no longer with us, but they were the pioneers who worked, often in anonymity, to lay the foundation for the industry we know today. These people and their work helped shape my career, and whether you realize it or not, they have helped shape yours. ■

Art Caputi has formed a consultancy offering expertise in all facets of winemaking and can be reached by email at ACaputi@msn.com or through his website: *artofwinemaking.com*

Edited from the 2000-ASEV Merit Award presentation in Seattle, WA, June 2000.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Sameness in wines — A developing problem?

I have been prompted to write this column by reading an article entitled "Neill's Vineyard" in a recent issue of the well-known wine magazine *Decanter* in the United Kingdom. In this article, wine journalist Richard Neill declares that the wines of the world are becoming more alike, as similar viticultural and enological practices are being used in more and more regions worldwide.

The article was obviously written somewhat tongue-in-cheek, and some of Neill's suggestions are extreme, but he does raise a question that I think warrants discussion. Should we aim for similarity in wine styles across the world, or should we be promoting regional diversity, even diversity from winery to winery? Neill claims, "Whichever wine competition, fair, or tasting you land up in, you can guarantee you'll encounter a familiar narrow band of wine styles."

Neill's 10-point plan to promote diversification

The following is a summary of Neill's suggestions. My response follows.

1. Use wild yeast in fermentations.
2. "Flying winemakers" should travel by ship to reduce their influence on wines of the world.
3. Uproot Chardonnay and Merlot, except in a few selected regions in France.
4. Over 50% of wine production must be from indigenous varieties. Where these are not readily available, as in California and Australia (where only locally-bred varieties would qualify) then production can be less than 50% from non-French vines. In any event, clones should be chosen at random.
5. Barrels must be made from local wood.
6. All vineyards should use organic production methods.
7. Richard Smart should retire henceforth, so as to stop blurring the regional differences in vineyard techniques.
8. Irrigation should be banned in the New World, and reverse osmosis in the Old World.
9. Ban all national and international wine competitions, because they encourage sameness of style. Neill suggests that Mr. Parker might also take early retirement.
10. Wine labels should reflect local culture and heritage, avoid using names with Ridge or Valley or Creek, and avoid the ubiquitous suggestion that wines go well with cheese, red meat, and pasta.

Richard Smart's reply

Neill's suggestions are obviously more about the premium end of the market than the "cheap and cheerful" sector, which of course has the greatest volume. I believe that consumers demand uniformity in style of their everyday lower price wines from year to year, and they also desire lower prices. It goes without saying that production of such wines demands the use of the best technology available; use of indigenous yeasts, for example, which can result in variable fermentations, is not appropriate.

Let me then respond to some of Neill's points from the viewpoint of premium and super premium wines in the price range of $15 and upward.

Item #2: Flying winemakers

I know many people who do international winemaking consulting, and I have seen the benefits they can bring to their client's products. Not all countries have ready access to large numbers of trained winemakers, as is the case in the U.S. and Australia.

Often the role of the consultant winemaker is to introduce appropriate sanitation measures. To the extent that some so-called regional wine characters have in the past been wine faults, then Neill is correct in saying that flying winemakers are reducing wine diversity. But surely consumers prefer the choice of being able to drink fault-free wine.

Item #3: Stop Merlot and Chardonnay production

As extreme as this statement is, I have some sympathy with the idea that most New World countries use a few French varieties excessively. When we consider that there are somewhere between 5,000 and 10,000 grape varieties in the world, why is it that most regions limit themselves to just a few, and these French at that?

All grape and wine producers will immediately respond by stating that this is what the market demands, which is true enough. Many consumers think that being able to request a "Cab" or a "Chard" is the end of the road in terms of wine knowledge. Interestingly, I know of no evidence that the half dozen or so "international" varieties are inherently better or more interesting than many other varieties available.

Why is our thinking about varieties so restricted? I can think of several reasons; an important one is that most new wine regions emulate the French styles. This, in turn, speaks to the effectiveness of the French PR apparatus, which would have us believe that, in all things vinous, "France is best." Other European countries with excellent local varieties, such as Portugal, Spain, Italy, Greece, and Eastern Europe have been far less successful in promoting their wines.

Another important reason is that wine writers like Richard Neill have a fixation on the international varieties and surely have contributed to this situation. So one point of my 10-point plan for perfect wine writers (yet to be sent to *Decanter*) is that they mention the international varieties in less than 5% of their articles!

Item #4: Indigenous varieties should be promoted, and French varieties discouraged

This is an interesting viewpoint, and I must say, it's one with which I have a lot of sympathy. The market pressures for the international varieties are so strong that many producers are being discouraged from using local regional varieties, even when they make notable wines.

I see evidence of this in Europe, in vineyards of Portugal, Spain, Italy, Hungary, and Greece and even in southern France. Similarly one sees that clonal diversity is being lost, as new vineyards are being planted to fewer and fewer clones. Interestingly in Portugal there is now a research program to identify and preserve all clones of some important varieties, such as Tempranillo. Even though they may not have characters useful for today's requirements, these clones should be preserved in germplasm collections for some future use.

But what of places like Australia that have no native *Vitis* species. Here, I agree that producers should be encouraged to use a wider range of varieties, even though they must all be imported. And yes, I do agree with the 50% maximum of

French varieties. It is time we started to look more seriously at other European varieties, and also to do more local grape breeding. In comparison to other areas of grape research, breeding has attracted less than its fair share of funding support.

The situation in the U.S. is interesting. There are indigenous varieties, but they are ignored to a great extent, especially on the West Coast. Of course, most of these American species and varieties make wines that are not to the modern taste, and the foxy character is avoided like the plague. There are, however, some local varieties, which do make wine acceptable to today's styles and standards.

The standout variety among these is Norton, of course, also known as Cynthiana, a selection in *Vitis aestivalis*. This variety has been featured in ***PWV*** (Jan/Feb 1998), and Norton is poorly appreciated in the U.S. at large. It is well-suited to the hot humid climates of the southeast and is almost totally pest- and disease-tolerant. Note well, friends in California, Norton has reported tolerance to Pierce's disease in Texas! You will likely hear more of this variety in the future. And once again, I would urge more funding support for vine breeding programs.

Item #5: Use local oak for ageing

America fares better than many other countries in this regard, and American oak is well-known and appreciated around the world. So far as I know, there is no local oak in Australia, and I hope we are not obliged to use eucalyptus!

Item #6: Organic vineyards

This idea I have much less sympathy with. I do not think that so-called "organic" vineyards will increase diversity and increase quality. In fact, there are, I think, strong arguments to the contrary. Such vineyards are often stressed; leaf health can be poor and ripening reduced because of disease. In addition, to be truly organic, with no reliance on sprays to stop disease, the choice of varieties is restricted rather than widened.

Item #7: Richard Smart must retire

Again this is a sentiment with which I find sympathy. However, I would need to look to Mr. Neill to provide an alternate income.

On a more serious note, I do not think that the more widespread international use of practices such as canopy management reduces wine diversity. I believe a cogent argument can be made to the contrary.

I have tasted herbaceous wines from every corner of the globe, where herbaceousness is due to excessive shading. Canopy management can allow natural flavors of the grape to be expressed, and these then can be different from region to region, rather than being herbaceous — and therefore monotonously similar. In addition, red wine color can be improved, and disease pressure reduced.

I judge myself not guilty of inducing homogeneity to international wine style. As an aside, I do promote indige-

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nous varieties and clonal diversification in my travels, as well as the use of lesser-known varieties.

Item #8: Irrigation be banned

While this point is over-stated, again I have some sympathy here. If there is one practice, that has reduced wine-style variation in the last 30 years, it is the widespread use of irrigation, especially drip irrigation.

The most important effect of the local climate (*terroir*) on wine style and quality is expressed via the impact of vine water stress. Soil characters become much less important when we irrigate, and reducing the differing levels of vine water stress between vineyards does reduce diversity.

I would not go so far as to ban irrigation, but I would advise grape producers to use it more effectively as a tool to produce different wine styles. I am interested to note, in Australia, the emergence of some labels promoting wine "from non-irrigated grapes" or "dry-land." This tendency will increase, I think, and become more fashionable in the future, taking on the merit attributed to "old vines," for example.

Conclusion

Thanks to Richard Neill for his thoughtful article. There are points here, which we grape and wine producers of the New World must heed. But please, Mr. Neill, make our task easier. As long as you and your wine journalist ilk continue to write about and promote just a few varieties, then surely the task of increasing varietal diversification is made all the more difficult.

Paradoxically, I wrote the first draft of this column in a hotel room in Budapest, as I was due to consult at Lake Baleton the next day. After I finished the draft and submitted it, I went to a local wine Festival, set in the grounds of the Old Castle on a hilltop overlooking the Danube and the city. Sure enough, the first wines I was offered at most stands were "international varieties," such as Chardonnay, Sauvignon Blanc, Cabernet Sauvignon, and Merlot. Richard Neill's comments were surely justified!

The local producers were, however, proud to show local varieties, such as the whites Irshai Oliver, Joufark, and Cserszegi Fuszeres, the latter being labeled "the unpronounceable grape variety." The local red wines were also outstanding, including Kekfrankos, and the fabulous Tokay wines from Furmint. ■

Dr. Richard Smart, "the flying vine-doctor," is an international viticultural consultant. Contact him in Australia by fax at 011-612-6584-0121, or by e-mail: vinedoctor@compuserve.com. Visit his home page at http://www.smartvit.com.au. He visits America frequently and can be contacted at Vinquiry in Windsor, CA, tel: 707/838-6312.

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by Sue Weeks

Measure your performance every day using standards and duplicates

How does a winery laboratory ensure that its results are accurate on a day-to-day basis? The easiest and most often used method is to include standards and duplicates in each batch of analysis performed.

What is a standard?

A standard is a known volume or weight of a target compound, usually prepared in an aqueous solution. A standard is treated and analyzed in the same manner as a sample, including any necessary dilution steps.

Standards fall into several different categories. A compound that is stable in its natural state is called a primary standard (for example powdered glucose or fructose, malic or lactic acids). Such compounds do not usually absorb water and are stable in the laboratory environment. If available, they are the first choice for analysis standards.

When a primary standard for an analysis is unavailable, it is sometimes necessary to use the salts or diluted solutions of the target compound. These include, for example, potassium meta-bisulfite for a sulfur dioxide standard or sodium carbonate for a carbon dioxide standard. The target analyte in these compounds can be easily calculated using stoichiometry.

What is a duplicate?

A duplicate is a sample that is run in the same batch of analysis more than once. A duplicate is prepared from scratch, that is, any sample preparation, such as dilution, is also repeated. A sample that is not re-prepared but is repeated through a batch (often several times) is called a check sample. A check sample is particularly useful in monitoring instrument drift; however, it does not validate the preparation of the sample or the analysis.

It is useful to document, preferably in the method, how many duplicates should be included in each batch of analysis. The inclusion of a duplicate every fifth sample is fine for most routine situations. That is to say, a batch of six samples would include two duplicates — the first and sixth. If the analysis is specialized or particularly difficult, more duplicates may be necessary. Duplicates can be analyzed immediately following the original sample, or run together at the end of a batch.

Preparation of standards

Preparation of standards is critical in measuring analysis performance. After all, if the standard is not accurate, what is the reference point? So, how do we ensure accurate preparation of standards? Factors that may affect accuracy include:

- Purity of the standard
- Accuracy of the balance used for weighing the standard material
- Accuracy of the glassware used for preparing the standard solution
- Quality of the diluent.

Calculating standard recovery

Once you've analyzed the samples and included a known standard in the batch, how do you work out the standard recovery? It is a simple matter of dividing the result by the expected result and multiplying by 100 to obtain a percentage.

For example, you prepared a 5 g/L aqueous solution of tartaric acid to use for a titratable acidity standard.

Expected result = 5.0

Achieved result = 4.2

4.2/5.0 = 0.84 x 100 = 84% standard recovery

The next, perhaps more important question is, what constitutes an acceptable standard recovery?

Acceptable standard recovery

It is important that you decide how a standard is to be used to improve the accuracy of your results. For example, if a standard of 10 g/L sugar produces a result of 15 g/L, what does it tell you about the batch of analysis? Was the standard incorrectly prepared, or did something else go wrong?

Having standards in a batch is a waste of time if you don't use them to measure your performance. One of the best ways to do this is to decide (before you perform the test) what the specifications for acceptance are to be. Should they be plus or minus 5% (or 95% to 105%) standard recovery? The answer depends on the accuracy of your method in the first place.

If, for example, you are measuring a 10 ppm solution of free SO_2, it would be quite difficult to achieve a standard recovery of plus or minus 5%. If you applied reasonable criteria to this example you may decide to opt for plus or minus 2 ppm, even though in standard recovery terms, this is plus or minus 20%.

On the other hand, if we were to review the titratable acidity calculation example above, it could be suggested that 84% recovery for a titratable acidity standard would not be acceptable. A recovery closer to 95%, or a result of 4.75 g/L or better, would be more acceptable.

The acceptance of standard recovery data is dependant on the accuracy and requirements for the analysis. The acceptable recovery range should be decided prior to the analysis and should be consistent — that is you shouldn't change it on a daily basis depending on how busy you are!

What do I do if my standard recovery is out of specifications?

There are some laboratories that might be tempted to apply this standard recovery across the other results in the batch (*i.e.*, divide all the results by the standard recovery), but this can be foolhardy if the results are to be used in any winemaking decision.

A standard recovery result that is out of specifications is usually a good indicator that the rest of the results in the batch are suspect.

This could be due to:
- Problems with one or more of the reagents
- A problem with the apparatus or instrument
- A problem with operator, or
- A problem with the standard itself.

The only way to determine the source of the error is by a simple process of elimination.

Duplicate specifications

Specifications for duplicates can be based on reasonable expectations for the analysis and also on the requirements of the winemaker. For example, a duplicate specification of plus or minus 0.5 g/L might be fine for a high level of a malic acid or sugar in a sample when the result is high, however, as the wine reaches the critical level, where racking or sulfuring decisions are based on the analysis results, much tighter specifications would be used.

It may also be necessary to assign different specifications at different concentrations. For example, a plus or minus 2 ppm

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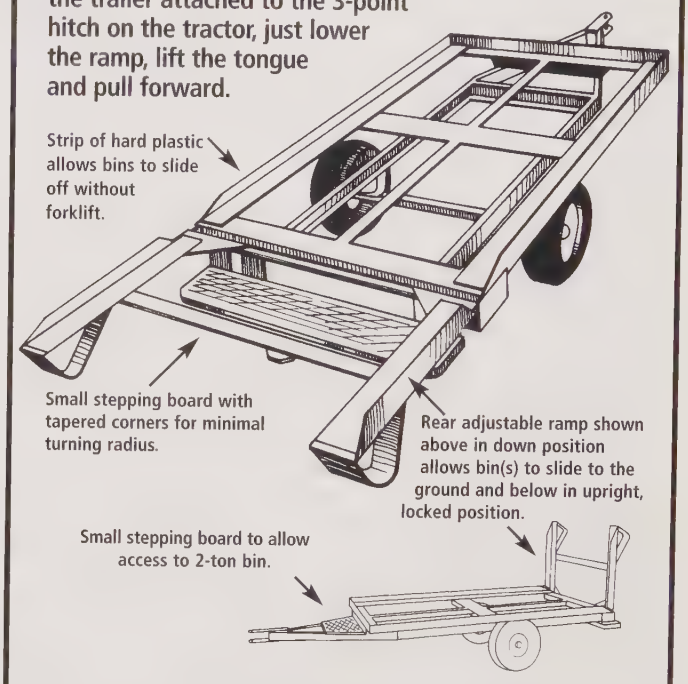
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specification for sulfur dioxide might be fine at 20 ppm, but would be difficult to achieve at 200 ppm. Common sense plays an important role here. The take home message is that duplicate specifications have to be achievable, and if you make them too tight, you risk creating a lot of extra work for yourself without gaining any further accuracy or efficiency.

Why measure performance every day?

The reason why these checks should be performed every day is two-fold. First, if we ran the standard checks once a week, and we found an error, we would have to assume that the error occurred immediately after the last time we performed the check, putting all the results generated since that time in doubt. As many analyses may have been performed since the last check, a once-a-week check presents an unacceptable and potentially costly risk.

Evidence suggests that including standards, and duplicates in batches of analysis every day leads to a significant decrease in rework, increasing the efficiency of the laboratory and, ultimately, the bottom line of the winery! ■

Next issue: Equipment calibration — Why everyone should do it

Sue Weeks is an Australian wine laboratory consultant. She provides assistance in areas of formal or informal quality system implementation, method validation, and troubleshooting, laboratory setup, personnel selection, and staff training. She also facilitates international wine-industry training in conjunction with the Communicating for Agricultural Exchange Program (CAEP), in Fergus Falls, MN. She visits America often and can be contacted through the Bibber International website at www.bibber.com.au or by fax at 618/8358-1676. She can also be contacted through Gordon Burns at ETS Laboratories (St. Helena, CA) at tel: 707/963-4806.

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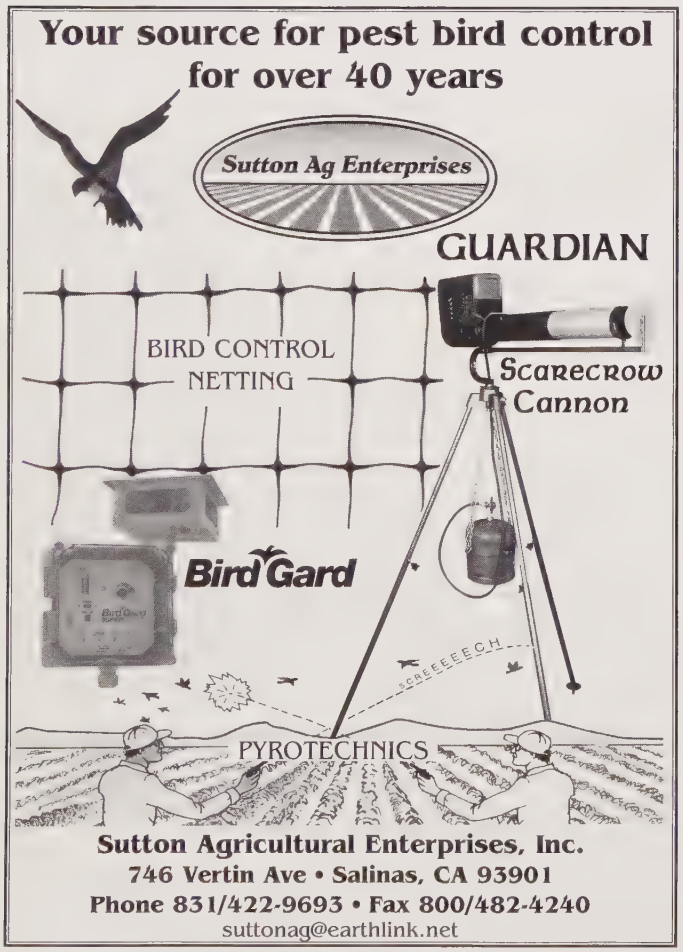

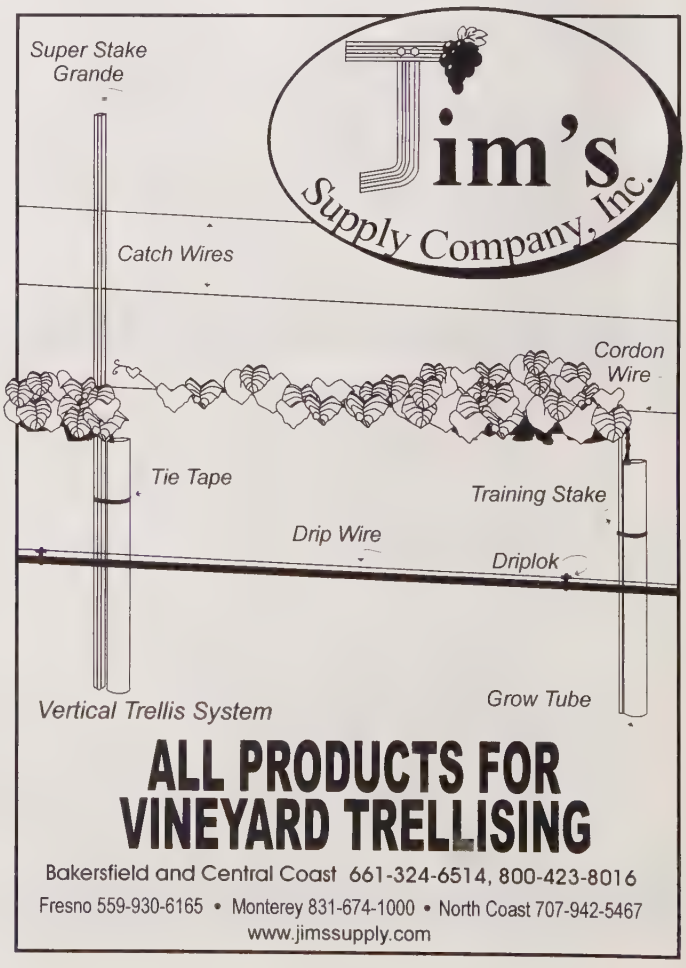

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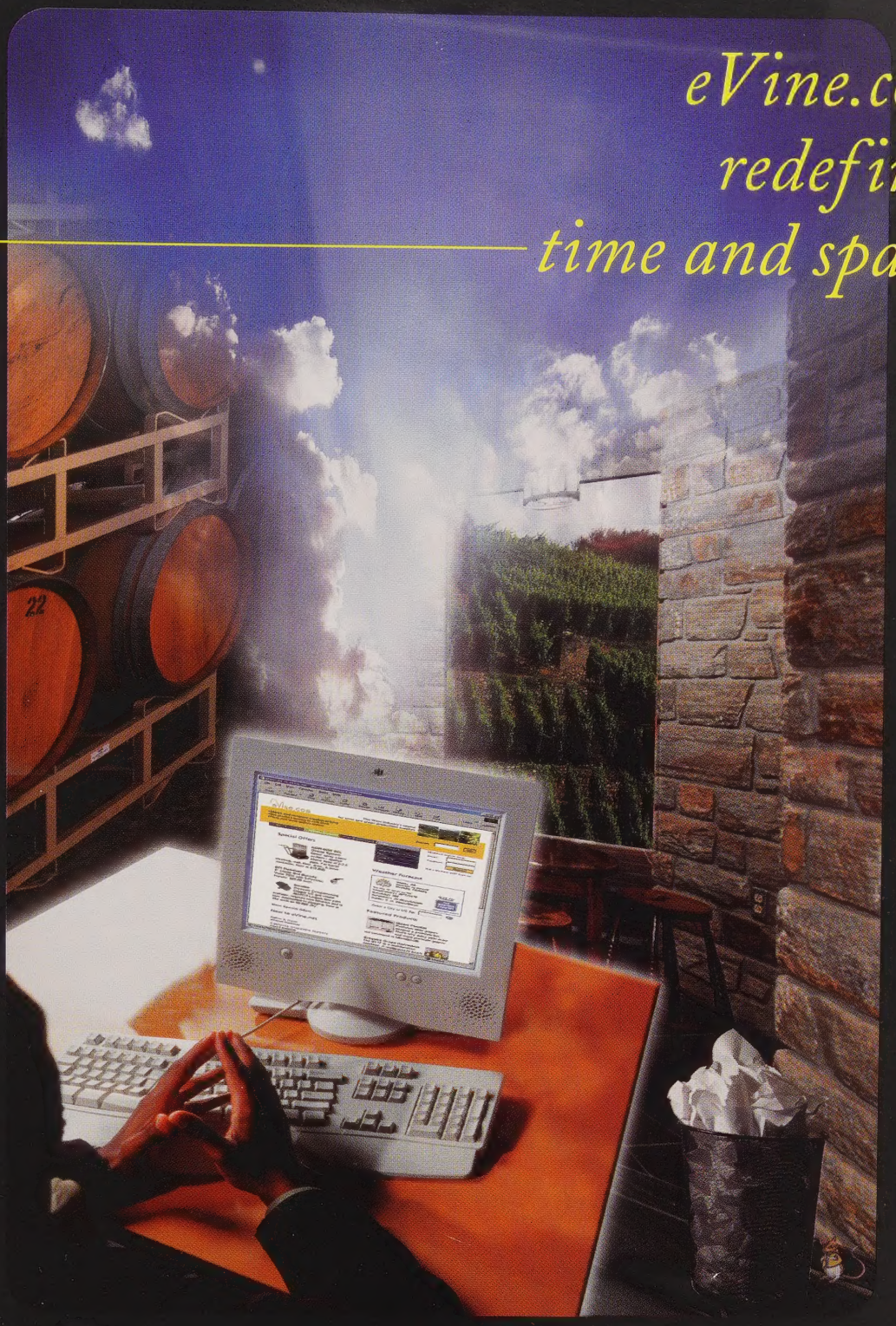

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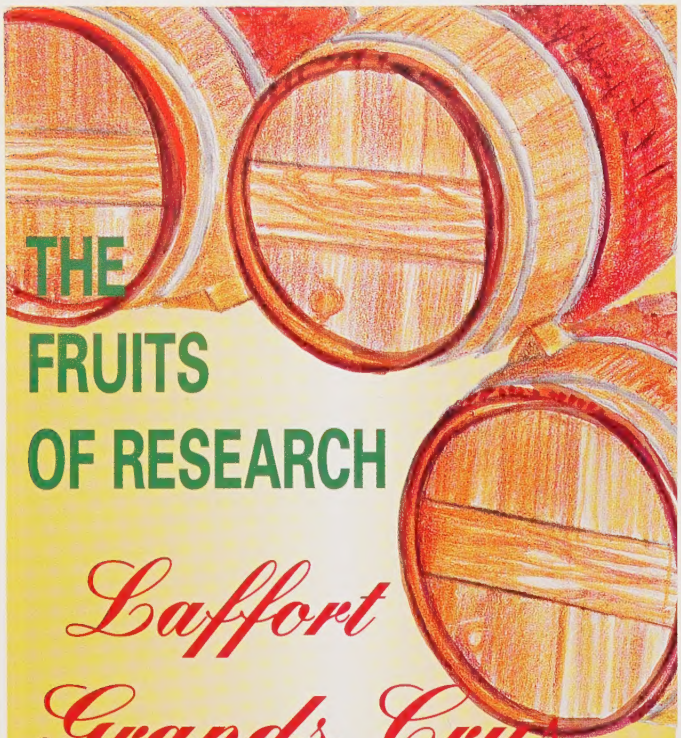

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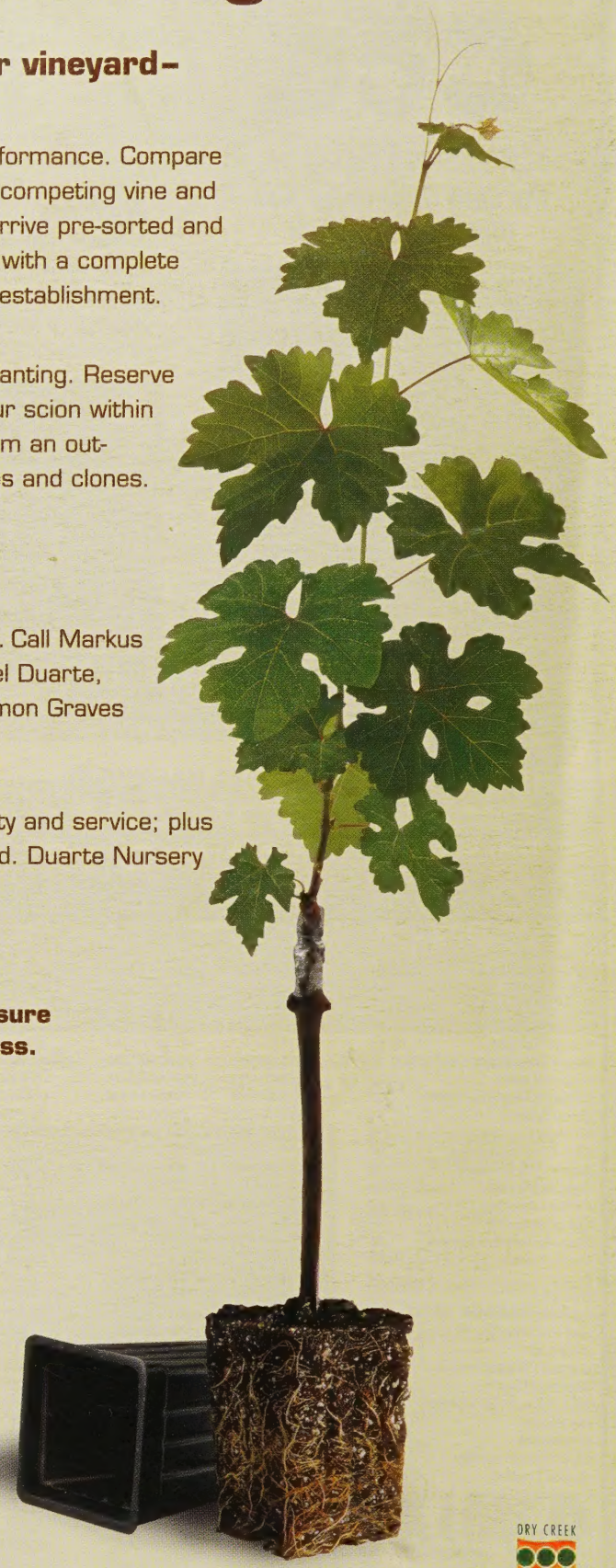

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